WST2

Washington State Technology Transfer

Washington State Department of Transportation

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Washington State Technology Transfer

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If you have a change of address, please contact us with the old and new addresses.

If your agency or firm receives issues addressed to a person who is no longer employed there, please call the WST2 Center at (360) 705-7386.

Dan Sunde
Director of Technology Transfer
WST2 Center

From the Editor's Desk

I'd like to take this opportunity to thank each one of you that has shared your inventions, innovations and technical expertise with your transportation counterparts in Washington through the *WST2*. You are the reason technology transfer works. The success of technology transfer starts with your spirit of sharing and your willingness to take the time and effort to pass on your ideas to others.

The WST2 Center receives compliments regularly on the content of the *WST2*, as well as requests from other periodicals to reprint your articles. Your ideas, creativity and technical knowledge are valued and are being spread across the U.S.A. and literally around the world. Besides the Washington State Department of Transportation sending copies of the *WST2* to each of the fifty states and British Columbia, the Federal Highway Administration is currently distributing *WST2* internationally to technology transfer centers in Europe, Africa, Asia, also Central America and South America.

I would also like to invite those of you who haven't yet contributed to *WST2* to do so. Send us information about your experience with developing or implementing new transportation technologies or practical ideas you have incorporated to make your job easier, safer, more efficient, or more cost effective.

Use the *WST2* as your means of technology exchange.

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The Local Technical Assistance Program (LTAP) is a national program financed by the Federal Highway Administration (FHWA) and individual state transportation departments. Administered through Technology Transfer (T2) Centers in each state, LTAP bridges the gap between research and practice by translating state-of-the-art technology into practical application for use by local agency transportation personnel.
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Washington State Department of Transportation

U. S. Department of Transportation
Federal Highway Administration

Update on MUTCD 2000 Adoption Process

By Edwin Lagergren, P.E., Traffic Operations Office, WSDOT

You may recall in my WST2 Winter 2001 article, I announced that the Final Rule of the *Manual on Uniform Traffic Control Devices — Millennium Edition (MUTCD 2000)* was published in the December 18, 2000, edition of the *Federal Register*. I also mentioned that the *MUTCD 2000* would require a formal adoption by WSDOT in Washington Administrative Code (WAC). The purpose of this article is to provide you with additional background information on the legal requirements to adopt a uniform State standard for traffic control devices and bring you up to date on the adoption of the *MUTCD 2000* in Washington State. Note: *MUTCD 2000* is the title in large letters on the front of the new manual. The *MUTCD — Millennium Edition* is also acceptable.

In the year 1927, two noteworthy things happened in transportation: Charles Lindberg made the first non-stop flight across the Atlantic Ocean and the *Manual and Specifications for the Manufacture, Display, and Erection of U.S. Standard Road Markers and Signs* (the predecessor to the *MUTCD*) was published. In the future all states would adopt this standard or use this standard as the basis for their own standard. Since that time drivers have become accustomed to and expect uniform traffic control devices wherever they travel. Incidentally, Babe Ruth hit 60 home runs that year and transported himself around the bases 60 times.

The law also requires that traffic control devices along county roads fully conform to these adopted standards, and those along city streets conform to the extent possible.

In the state of Washington, Revised Code of Washington (RCW) 47.36 *Traffic Control Devices* requires the Washington State Department of Transportation (WSDOT) to adopt a uniform standard for traffic control devices installed along state highways. The WSDOT shall furnish to the boards of county commissioners and the governing body of any incorporated city or town, a copy thereof. The law also requires that traffic control devices along county roads fully conform to these adopted standards, and those along city streets conform to the extent possible.

To fulfill this responsibility, WSDOT, through Chapter 468-95 of the WAC, adopts the Federal Highway Administration (FHWA), *Manual on Uniform Traffic Control Devices*. Also included in 468-95 WAC are legislative preferences that modify specific parts of the *MUTCD*, and items that address traffic control considerations unique to the state of Washington. Historically, the Attorney General's Office, Tort Division, has recommended that MUTCD modifications be limited to those necessary to comply with state law, where state law and the MUTCD differ.

MUTCD 2000 Information

The electronic version posted on FHWA's *MUTCD* website on December 18, 2000 is the official FHWA publication. *[Editor's note: the site is listed at the end of this article.]* FHWA is not printing copies of the millennium *MUTCD* because of the prohibitive costs involved. The website version is also more efficient and reliable when revising the MUTCD.

The *MUTCD 2000* published in the December 18, 2000, edition of the *Federal Register* was subject to errata corrections. On June 14, 2001 the FHWA published the errata corrections and the *MUTCD 2000* with the errata corrections. National organizations (ATSSA, ITE, AASHTO) have partnered to print hard copies of the *MUTCD 2000*. The *MUTCD* will also be available from the General Printing Office (GPO). The corrected

MUTCD 2000 should be available in printed form by the time you receive this newsletter.

There will be two printed versions of the *MUTCD 2000*. The first version is 8.5 inches by 11 inches, 3-hole punched and bound by chapter. The second version measures 8.5 inches by 11 inches, and is the entire manual, perfect bound and 3-hole punched.

The *MUTCD* will also be on CD ROM from several vendors. The uncorrected version of the *MUTCD 2000* is on the WSDOT's July 2001 Engineering Publications CD ROM. The errata corrected version missed the cut off by about two weeks. The corrected version will be on the next CD ROM.

MUTCD 2000 adoption process information

With the receipt of the errata corrected manual, the adoption process has begun. The effective date of the Federal Register final rule for the *MUTCD 2000* is January 17, 2001. States have 2 years to adopt the MUTCD changes. The adoption date is January 17, 2003. The Washington State MUTCD 2000 adoption process should be completed before that date.

The *MUTCD 2000* adoption process will contain three major components: the notification, education and comment solicitation phase; the comment review process; and the formal adoption process. A statewide notification of the intent to adopt the *MUTCD 2000* started the process. Local Agencies, WSDOT Regions and Service Centers, other State Agencies and the public sector have been solicited to participate in the review and comment process. Local agencies will be furnished a printed copy of the manual for review and comment by WSDOT Highways and Local Programs. A series of meetings will be held around the state to review the *MUTCD 2000*. The State Traffic Engineer will collect local agency, State agency, and public comments. A technical review committee, composed of State, Local Agency and Private Sector people will review the comments. The Washington State Modifications to the *MUTCD 2000* will be developed from these comments. The modifications will be

sent out to interested parties for review. The modifications will be finalized and the formal adoption process will begin. The formal adoption process will consist of two public hearings. It is hoped that all concerns were addressed prior to these hearings. The *MUTCD 2000* will be adopted with modifications at the conclusion of the formal hearings.

The State will then notify concerned parties that the *MUTCD 2000* has been adopted, and will disseminate the Washington State Modifications to the *MUTCD 2000*.

Remember, the MUTCD 2000 will not go into effect in Washington State until the completion of the adoption process. Please bookmark the WSDOT Traffic Operations Homepage to keep up on the status of the adoption process.

Resources

- The text of the 1000+ page MUTCD 2000 can be found on, and downloaded from, the Federal Highway Administration's MUTCD web site at: *MUTCD.fhwa.dot.gov*.
- The MUTCD 2000 and information on the adoption process can be found on the WSDOT Traffic Operations homepage at: *www.wsdot.wa.gov/fossc/trafficoperations/MUTCD.htm*.
- Printing the MUTCD 2000 on a color duplex printer takes about 2 to 3 hours.
- The printed manual can be obtained at these sites:
  - American Association of State Highway and Transportation Officials *www.aashto.org*
  - American Traffic Safety Services Association *www.atssa.com*
  - Institute of Transportation Engineers *www.ite.org* ▲

"Click, Listen, and Learn" About the MUTCD Changes

Take advantage of a 90-minute "Click, Listen, and Learn" training session on August 8, 2001, titled "MUTCD: Setting You Straight on the Changes." Take advantage of this timely, interactive training delivered right to your own site for only $140. What a value — a key professional topic, top national instructors, no travel or per diem expenses, and your crews can be back on task within 2 hours! All you need is an office computer with Internet access and a speakerphone! Attendees submit questions via email or live during the question & answer sections of the program.

Instructors are Cherie Kittle and Linda Brown from FHWA, and Dan Centa, P.E., City of Pueblo, CO. ▲

To register or obtain more information including presentation time in your area, visit the 'Education' section on the APWA website (www.apwa.net), click on "Click, Listen, and Learn" on the left side of the page, or call Ashley Gann at (816) 472-6100 ext. 3511.

Footprints & Bike Tracks 2001 Conference

Biking and Walking: Transportation for this Millennium

By Kimberly Colburn, Information Officer, WSDOT Highways & Local Programs

Footprints & Bike Tracks 2001, *Bicycling And Walking: Transportation for this Millennium* Conference will be held October 10-12, 2001 at the WestCoast Olympia Hotel in Olympia, WA. The conference provides an educational forum to increase the number and safety of people walking and biking in Washington's communities. The conference shows how bicycle and pedestrian facilities and programs can help create more livable communities. Every two years Footprints & Bike Tracks increases awareness of walking and bicycling. Discover new programs and projects, share local successes, and plan future bicycle and pedestrian improvements!

The conference is designed for people working or advocating for bicycle and pedestrian facility improvements. The audience is potentially very broad and includes a wide range of transportation stakeholders such as elected officials, planners, engineers, educators, advocates, developers and financiers, health providers, and law enforcement officers.

Conference session titles include:

- Recent Trends & Future Implications
- Trail Development in New Corridors
- Community Based Bicycle Education & Pedestrian Safety.

There will also be three mobile workshops available for conference attendees.

Watch for your conference registration brochures! They were mailed out during the first week of July 2001. ▲

Registration and Conference Program Information

For registration information, please contact Kimberly Colburn at (360) 705-7879 or *ColburK@wsdot.wa.gov*.

For more information regarding the conference program, please contact Barbara Culp at (206) 224-9252 or *BarbC@bicyclealliance.org*.

SLOW:
You're on traffic camera

LAKEWOOD: City is first in state to photograph, ticket red-light runners, school zone speeders.

By Cecilia Nguyen,
The News Tribune

Automated cameras today begin monitoring speeders and red-light runners in Lakewood.

In partnership with the Washington Traffic Safety Commission, the City of Lakewood becomes the first in the state to test the effectiveness of photo traffic enforcement.

A $360,000 federal grant will support the pilot program through Sept. 30. State officials then will review data and determine if the effort should continue and perhaps expand.

School-zone speeding enforcement starts today. Red-light signal enforcement at two busy intersections launches April 15.

City officials hope photo monitoring will cut red-signal violations in half and discourage speeding around school zones.

"We're trying to remind good citizens who have gotten into bad habits to drive safely," Lakewood sheriff's detachment Chief Larry Saunders said.

The speed-checking cameras, which will be located in a van, will rotate among the 27 school zones in Lakewood. The city will likely concentrate on high-speed, high-volume arterials, Public Works Director Bill Larkin said.

The cameras will photograph vehicles and license plates — but not the driver.

Intersection cameras that monitor red lights will remain at Phillips Road Southwest and Steilacoom Boulevard Southwest and at Bridgeport Way Southwest and San Francisco Avenue Southwest.

The cameras will photograph vehicles and license plates — but not the driver. Tickets will be mailed to the registered owner of the vehicle.

While some residents have expressed concerns about the cameras, complaints have been limited, Saunders said.

Lucy Santa Cruz, 37, who lives near Custer Elementary School, sees motorists zooming down Custer Road West in the morning when children are walking to school.

She thinks the cameras will be just as effective in reducing speeding and signal violations as patrol officers.

"It's a way for the police to enforce traffic laws without having to take them away from more urgent issues," Santa Cruz said.

But Kendall Cooper, who admits speeding is a problem in the school zones, thinks the cameras are intrusive.

"It's like 'Big Brother,'" said Cooper, a Lakewood resident for 14 years. "This is just an excuse for the city to make some money."

Red-signal violators will get a $71 ticket in the mail. Speeding fines, which double during school hours, will depend on how fast a vehicle is going.

But the purpose of the cameras is not to issue tickets and make money, Saunders said. "We'll be lucky if we break even."

The issue, he said, is safety. Signs warn motorists that the intersection or school zone is photo enforced.

"The whole issue is not to catch people," Saunders said. "This is just a reminder that Lakewood drivers have been driving too fast."

A study last year found nearly 85 percent of Lakewood residents drive at least 10 miles over the speed limit, Larkin said.

City employees tested the photo radar speed enforcement at 3 p.m. last Tuesday at Dower Elementary School. In four minutes, they recorded 22 violations.

While camera enforcement is new to this state, it is widely used in other states, Canada and Europe.

Mesa, Arizona, has used photo enforcement for nearly four years. The city has cameras at 18 intersections, along with five mobile speed cameras.

"The overall accident rate has gone down 22 percent citywide," Mesa traffic coordinator Brenda Black said. "That's telling us that the cameras are changing driving habits."

It's not a moneymaker, she added. Mesa lost $10,000 last year.

"Hopefully, one day, we'll break even," Black said. "The goal is safety and to change people's driving habits."

Washington state officials are optimistic traffic safety will improve in Lakewood as well.

Les Pope of the Washington Traffic Safety Commission said other cities will be watching closely. Seattle, Spokane and Vancouver, Washington have all expressed an interest in installing traffic enforcement cameras once the test is completed.

"I think we'll learn that this is an affordable system that will effectively enforce traffic," Saunders said. ▲

The News Tribune staff writer Cecilia Nguyen covers Lakewood. Reach her at 253-597-8692 or cecilia.nguyen@mail.tribnet.com.

The Facts About Photo Enforcement

- The photo radar speed enforcement will rotate among the 27 Lakewood school zones.
- The photo radar will cite motorists driving more than six miles above the speed limit.
- Speeding fines double during school hours. High school hours are 7:10 a.m. to 2:55 p.m.; middle school hours are 8 a.m. to 3:30 p.m.; elementary school hours are 7:35 a.m. to 3:05 p.m.
- Cameras will photograph vehicles that enter an intersection after the signal turns red. Citations will be mailed to the registered owner.
- Registered owners can contest tickets if they testify under oath that they were not driving the vehicle at the time.

RECALLED

Danger Signs Video Recalled by FHWA

An appeals court overturned the 1997 manslaughter convictions of the three teen-agers who were accused of removing a stop sign from an intersection where three other teens were killed in a crash just hours later. The Federal Highway Administration (FHWA), Office of Chief Counsel has advised that the appeal and pending new trial of the three convicted teenagers requires the FHWA to take immediate action regarding the Danger Signs video. Therefore, this video (which portrays the teenagers as guilty) should neither be shown nor distributed, pending its modification. FHWA feels since they have received notification that the teenagers' convictions have been overturned, it would be improper for them to allow the continued showing and distribution of the Danger Signs video, portraying the three teenage defendants as convicted felons. For this reason, they are advising the discontinuation of any future distribution and/or showing of the video until the video is modified.

The FHWA is seeking to have current copies of the video returned to facilitate their replacement with an updated version. Therefore, please return all copies of the video to them. FHWA plans to contact all parties who have returned the video to arrange for distribution of a modified version. If you are unable to return any copies, please at least ensure that the video is shelved and no longer used or distributed. This will help protect the sanctity of the new trial and not taint the legal process by prejudicing the rights of the three teenagers. Continued showing of the video may harm these individuals' right to a fair impartial proceeding.

Continued showing of the video may harm these individuals' right to a fair impartial proceeding.

If you are unable to return your copies, please advise FHWA via the below address or fax (202) 366-3222 indicating that your copies of the video will no longer be shown, used or distributed. Please specify the number of copies you have so that they may be replaced with the updated version.

Please return all copies of the video to:

Federal Highway Administration Safety Core Business Unit, HSA-30, Washington, D C 20590. ▲

NEW

One-Stop Funding Site Now on the Web!

Washington's Secretary of State recognizes the Infrastructure Assistance Coordinating Council (IACC) as a non-profit organization. The IACC has been in existence for over 15 years and is comprised of staff from state and federal agencies, nonprofit organizations, local government associations, universities, and related organizations that provide infrastructure related financial and/or technical assistance to local governments in Washington State.

The IACC is dedicated to helping Washington communities identify and obtain resources they need to develop, improve, and maintain public works programs. Together with IACC, communities are better able to provide the infrastructure necessary to enhance, preserve, and protect Washington's environment and quality of life.

Now local agencies have a new tool to help them muster scarce yet much needed funding resources. This is a one-stop shopping center! The IACC has a new website called **InfrastructureDATABASE** (*www.infrafunding.wa.gov/default.htm*) ▲

NEW

Traffic and Safety List Serve Available to Local Agencies — Sign up now!

This is a very user-friendly site, which provides four input areas.

1. What type of assistance would you like?
   - Grant
   - Loan
   - Technical Assistance
2. What category of assistance? For instance Education, Transportation or many other topics.
3. What type of organization would be applying for assistance?
4. What type, if any, match requirement would apply?

InfrastructureDATABASE is your resource for locating infrastructure funding or technical assistance in Washington State. This site is brought to you by the Infrastructure Assistance Coordinating Council (IACC). ▲

A forum to share information about local agency traffic and safety issues is now available via the WST2 Safety Webpage. The Washington State T2 Center Safety Management List Serve is committed to the sharing of information between agencies on issues concerning traffic, safety and management systems for the local agency. This is a site to share what you know and learn what you don't. Here you will periodically receive the latest technology covering traffic safety and local agency safety management systems.

The Washington State Technology Transfer Center is dedicated to covering a wide range of technical topics to assist Washington State communities and local governmental agencies in managing, constructing, and maintaining their transportation infrastructure. This list serve delivers information and resources covering the latest in traffic technology, traffic safety, roundabouts, safety management, safe communities, and other issues that the local agencies wish to address. There is also a host of training opportunities, free publications and common sense technical solutions available to help you with your traffic and safety programs.

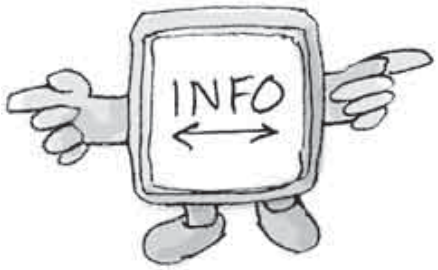
...opportunities for local agency's to talk with one another....

The real advantages to subscribing are networking opportunities for local agencies to talk with one another, sharing challenges and solutions.

To check out this new list serve go to the following web address:

http://www.t2sms-l@lists.wsdot.wa.gov/guest/RemoteListSummary/T2SMS_L ▲

For questions about the list serve contact Dave Sorensen at (360) 705-7385 or by e-mail at SorensD@wsdot.wa.gov.



Washington Counties Risk Pool Sponsors the 11th Annual Traffic Collision Investigation Seminar

Dave Temple, a Vehicle Systems Analyst with the WSDOT, explains the complex workings of truck brakes to participants at the 11th annual Traffic Collision Investigation Seminar April 17-19 in Wenatchee, sponsored by Washington Counties Risk Pool.

Temple and John Hunter highlight many points for law enforcement and other collision-scene investigators — and those who review their reports — on what to check for when examining a crash site. Hunter is a retired Washington State Patrol sergeant who headed the state's Major Accident Investigation Team (MAIT), and now serves as an accident reconstruction consultant.

Temple still serves on MAIT, and he has worked with the Office of Risk Management for the last 10 years.

Nearly 50 participants attended this year's seminar, representing many counties and cities from throughout the state.

Watch the WST2 for information on the next conference as the details are developed or contact the Washington Counties Risk Pool for further information. ▲

For More Information

Contact Jay Winter, Program Manager at the Washington Counties Risk Pool.

Phone: (360) 586-7447
E-mail: jwinter.wcrp@wacounties.org
Web: www.wacounties.org./wcrp

WSDOT Dry Well Research

By Al King, Operations Engineer, WSDOT H&LP

In what has become a significant issue for transportation facilities, the U.S. Environmental Protection Agency (EPA) has indicated that transportation improvement projects will have to address methods to retrofit dry wells in the future so that groundwater will not be impacted by storm water runoff or toxic spills.

Both Washington State Department of Transportation (WSDOT) and local agencies have constructed hundreds of dry wells for disposal of highway storm water runoff, many of which lay within sole source aquifer and wellhead protection areas. Dry wells have historically been important primary storm water disposal options in eastern Washington and are also often used in the glacial outwash plains in western Washington.

WSDOT is working with Washington State University to evaluate methods to retrofit storm water dry wells to meet the increasingly stringent EPA requirements. The research will evaluate the ability to achieve adequate treatment for highway contaminants with a filter media system. The technology was developed for use as a liner in infiltration ponds and designed to treat highway storm water runoff to groundwater quality standards.

Dry wells have historically been important primary storm water disposal options....

It has been extensively tested in the laboratory and in pilot scale trials, but has not been tested at an actual transportation storm water facility. The field test is planned in the Spokane area.

If proven to be effective, the system should reduce project costs while protecting groundwater supplies. If the performance of the system is verified, it would allow design of a retrofitted drainage system without major structural modifications, eliminate project costs that would ordinarily be used to remove the existing dry wells, and install alternative storm water drainage and treatment systems, such as infiltration basins. ▲

For further information about the research, contact Ed Molash, WSDOT Environmental Affairs Office at MolashE@wsdot.wa.gov *or (360) 705-7507.*

WSDOT Forms Now Available on the Web!

Here's a handy one to "Bookmark"! WSDOT Forms Management has just added a new website that makes WSDOT forms available to local agencies on-line via the Internet. The WSDOT has included downloadable electronic forms packages grouped by the following functional areas:

- Construction Forms
- Local Agency Forms
- Utilities Forms
- Materials Forms
- Agreement Forms
- Bridge Forms
- Consultant Forms
- Disaster Plan Forms
- Motor Carrier Services Forms
- Safety Management System Forms
- Traffic Forms
- Miscellaneous Forms

There is a "Full Install" capability that includes all of the forms that are distributed on the WSDOT Engineering Publications CD Library and an "Updates" page so subscribers can download revised forms found on the CD as well as on-line the packages above. ▲

You can find the forms at: http://www.wsdot.wa.gov/forms/.

Unveiling of the National Work Zone Memorial: Submission of Names Begins

Fredericksburg, VA - Memorials have become an icon of the American culture to help people cope with the inexpressible. Whether in the elegant granite face of the Vietnam Veterans Memorial, or through the spontaneous decoration of a fence outside Columbine High School, memorials are built to reflect our grief, our pride, and our humility in the shadow of a power far greater than ourselves.

Over the years, thousands of men and women have died in work zones. Those forgotten not only include work zone workers, but motorists, law enforcement officers, public safety officials (such as firemen and emergency medical technicians) and children. Until now, they have not had a fitting memorial. The American Traffic Safety Services Association (ATSSA) plans to introduce a new traveling exhibition in April, 2002, tentatively titled, "Respect and Remembrance: Reflections of Life on the Road," to honor these men, women and children on a continuous basis. The exhibition's centerpiece will be a memorial wall on which the names of those killed in work zones across the country will be inscribed.

In 1999 alone, 868 people were killed in work zones.

"What many people do not realize is the high number of motorists, not roadway workers, who are killed in work zones," said Roger Wentz, Executive Director of ATSSA. "This memorial will recognize all people killed in work zones over the years."

ATSSA member companies Eastern Metal/USA Sign, 3M and Reflexite Americas are the principle sponsors, material suppliers and designers of the National Work Zone Memorial. Other sponsors are sought to maintain the wall and contribute in other ways. They too will receive nationwide acknowledgement through an inscription on a separate sponsorship panel of the wall. Financial contributions to the National Work Zone Memorial offer participants national recognition for their support at four levels (Platinum $1,000, Gold $500, Silver $250 and Bronze $100) on the sponsorship panel.

The exhibition will also include an educational kiosk to tell the story of America's roadway workers using memorabilia or photographs contributed by employers and family members of those named on the wall. After the exhibition is unveiled in Washington, D.C., it will be made available to communities nationwide to use outdoors whenever possible – rain or shine – to reflect the conditions under which roadway workers perform their vital duties. Visitors to the exhibition may also receive a locally customizable handout with tributes, FAQ's, and information for traveling safely in work zones.

In the interim, as the memorial is constructed, ATSSA seeks supporters and friends to begin submitting names for inclusion on the memorial. To include a name, simply visit www.atssa.com and click on the National Work Zone Memorial link. There, you will find the necessary form for submissions. Names will be added to the memorial on a continuous basis.▲

More Information

The National Work Zone Memorial will be unveiled in April, 2002 during National Work Zone Awareness Week activities in the Washington, D.C. metropolitan area.

In the interim, as the memorial is constructed, ATSSA seeks supporters and friends to begin submitting names for inclusion on the memorial. To include a name, simply visit www.atssa.com and click on the National Work Zone Memorial link. There, you will find the necessary form for submissions. Names will be added to the memorial on a continuous basis. There are no costs associated with the submittal of names. Simply download the Name Submission Form from www.atssa.com and fax to ATSSA at (540) 368-1717, ATTN: Carrie.

Following the unveiling, the memorial will be made available to anyone in the roadway industry or interested communities nationwide as a "travelling" exhibition to be used in schools, in community centers, in DOT lobbies, at airports, rest stops, or as part of ceremonies launching new roadway construction projects nationwide. Those requesting the memorial will pay the shipping fee. To reserve the memorial for May 2002 and beyond, contact ATSSA's Director of Communications, James Baron, at (800) 272-8772, ext. 113 or by e-mail at *JimB@atssa.com.*

If you would like additional information, you may contact James Baron at (540) 368-1701 (office), (540) 368-2530 (home), (540) 842-1855 (cellular), or e-mail at *JimB@atssa.com.*

National Work Zone Memorial "Frequently Asked Questions"

Q "What is the purpose of ATSSA's National Work Zone Memorial?"

A Saving lives in work zones while advancing roadway safety are number one priorities for ATSSA. The latest statistics available reveal nearly 900 people killed in work zones annually. This is a tragic statistic that goes relatively unnoticed across America. Although several states have created memorials to remember work zone workers, a national memorial does not exist to raise public awareness of this issue while simultaneously recognizing all of those killed in work zones – not only the workers themselves. The National Work Zone Memorial will be designed to be an everlasting memorial to those killed in work zones across the country.

Q "Will workers be the only names listed on the memorial?"

A No. The majority of people killed in work zones nationwide are motorists, therefore, they too will be listed on the memorial, as well as members of law enforcement agencies, public safety officials (such as firefighters and EMT's), children and of course work zone workers. Names will be placed on the memorial in the order received, not chronologically or alphabetically.

Q "When viewing the memorial, how will I be able to tell which names are motorists, which are work zone workers, etc.?"

A A small icon will appear next to each name denoting Work Zone Worker, Motorist, Law Enforcement Officer, Public Safety Official or Child.

Q "How far back will ATSSA go to obtain names?"

A The name of anyone killed in a work zone – any year – is eligible for placement on the memorial.

Q "Will the gathering of names continue over the years?"

A Yes, the gathering of names will be an ongoing effort to keep the exhibition alive eternally.

Q "When will the memorial be unveiled?"

A The National Work Zone Memorial will be unveiled in April, 2002 during National Work Zone Awareness Week activities in the Washington, D.C. metropolitan area.

Q "Will the memorial be portable?"

A Yes. The memorial will be designed for easy assembly and / or disassembly. The memorial will be stored and / or shipped in a custom-made crate.

Q "The memorial is a great public-awareness display, but what will be provided with it to help the public understand how important work zone safety is?"

A Various information pieces will be created to accompany the memorial as it travels, including fill-in-the blank press releases for use in local communities, statistics and informational brochures. Already, a great amount of information on work zone safety exists at *www.atssa.com*.

Q "Who are the primary sponsors of the memorial?"

A The primary sponsors, designers and constructors of the memorial are Eastern Metal / USA Sign, Reflexite Americas and 3M. Additional sponsors are sought and needed to assist in covering the many miscellaneous expenses associated with the memorial, such as printed materials and other administrative needs.

Q "Are there various levels of sponsorship available?"

A Yes, there are four levels of sponsorship, Platinum Level ($1,000), Gold Level ($500), Silver Level ($250) and Bronze Level ($100). Sponsors names will appear on a panel of the memorial. To become a sponsor, simply visit *www.atssa.com*, download the Sponsorship Form and fax or mail the form back to ATSSA. You may contribute by check or by credit card.

Q "When will an artist's rendering of the memorial be available?"

A The memorial is currently in the design stage. As soon as a rendering is available, it will be posted at *www.atssa.com*. ▲

By David Sorensen, Traffic Technology Engineer, WST2 Center

Safety Management Systems — "It's Just Good Business"

Safety Management was introduced as a Federal mandate with the passage of ISTEA back in 1991. However, the Federal Government rescinded the management systems requirement a few years later. Prior to the SMS mandate being rescinded, the Washington State Department of Transportation documented existing state policies, safety processes and safety programs and successfully qualified them for Federal approval as comprising an existing SMS, one of the very few states in the country to do so.

Recognizing the tremendous potential of the SMS, a group of state and local agencies, lead by the WSDOT TransAid Service Center (currently Highways & Local Programs), went on to form a committee of local agency highway safety professionals to develop a safety management system model for local agencies. The result of their work, the Local Agency Safety Management System, is now available for agencies to implement, as they desire.

What is an SMS?

While the concepts and tools of safety management are not new, transportation safety in emergency services, law enforcement, and education within local agencies have not historically been organized into a single system. Neither have they been systematically integrated into road and street needs. Safety management integrates all these areas through a collaborative process. A safety management system can, over time, help reduce the incidence of response-driven safety improvements in favor of planned, prioritized, and system driven improvements.

Local Agency Safety Management Systems are all encompassing in that they identify and address all facets of road and street safety.

The fundamental goal of a Safety Management System (SMS) is to prevent and reduce the number and severity of roadway collisions, transportation related injuries, and property damage on local roadway systems. An added benefit is decreased tort liability. Tort liability is due to the lack of consistent object data in needs identification and decision-making. This is the strength of a Safety Management System. It provides consistent, objective and current information on the agency's transportation safety needs so that decisions concerning safety projects and policies are made by well-informed decision-makers and in proper priority.

SMS is a collaborative systematic community based approach to all elements involved in local roadway safety in lieu of a single public works based approach. The entire community is involved in the process.

Local Agency Safety Management Systems are all encompassing in that they identify and address all facets of road and street safety. This includes not only the obvious needs of the physical infrastructure and its condition from an engineering standpoint but also driver education, vehicle adequacy, non motorized safety, law enforcement, judiciary, licensing, emergency services, and many others. The nature of the system is truly a partnership of many agencies and organizations in the community. Together they have the potential for communicating better and coordinating efforts to collectively achieve safer streets and roads.

SMS is a technical tool, a budget tool, and a program development tool assisting local governments as

they progress through the decision processes of developing their complex road and street annual maintenance and capitol programs. Programming decisions are made from objective engineering data and collective input from all members of a Safety Management Committee. This committee represents members from all facets of the community, including elected officials, law enforcement, emergency services, public works, school, citizens, judiciary, planning, and others.

Why is Safety Management Important?

Competition for transportation dollars in the State of Washington has created a tendency for historical or preexisting highway safety needs to be under-funded at all levels of local government. Depending on which part of the state or which local agency is being considered, it is generally true that a combination of factors including inadequate transportation revenues, land use growth, congestion, abandonment of rail systems and others contributed to local decision makers' being forced to split the transportation revenue pie into far too many small pieces.

The net result of these factors is that safety improvements in general, as a stand-alone category of road programming, do not compete well for funding within agency budgeting and programming procedures. In larger urban areas, cities and counties are dealing with growth management, and attempting to provide suitable mobility for their constituents. Suburban and rural areas operate systems comprised of many miles of old roads, many of which are substandard by today's standards. Rural Agencies lack desired money to fund needed road improvements. In both cases, large and small agencies are making do with what they have and in the process safety needs are not being funded to the degree generally thought desirable. Transportation safety needs exist throughout the state in literally every city and county. They differ only by nature, type and magnitude from agency to agency and they are equally important to the provision of high quality, safe public transportation services for which our local governments are responsible. The SMS helps to clearly quantify and prioritize those needs.

SMS can save lives, maybe even your own or someone you know.

Influencing the balance of funding distribution in favor of more safety improvements is a target of the Local Agency Safety Management System. Development and implementation recommendations of Local Agency SMS do not, however, advocate local policy makers abandon their traditional highway program goals. Instead, these recommendations integrate transportation safety improvement initiatives to reduce human trauma and property damage into those existing program goals.

Are Local Agencies Practicing SMS ?

There are a number of local governments in Washington who, on their own initiative, have independently developed select programs that accomplish some SMS goals.

Overcoming resistance to change caused by institutional and human inertia is necessary for any successful business development and advancement. Agencies that adopt the Local Agency SMS process will see SMS as an opportunity to improve their service, enhance their market potential as service providers and develop their human resource potential. SMS

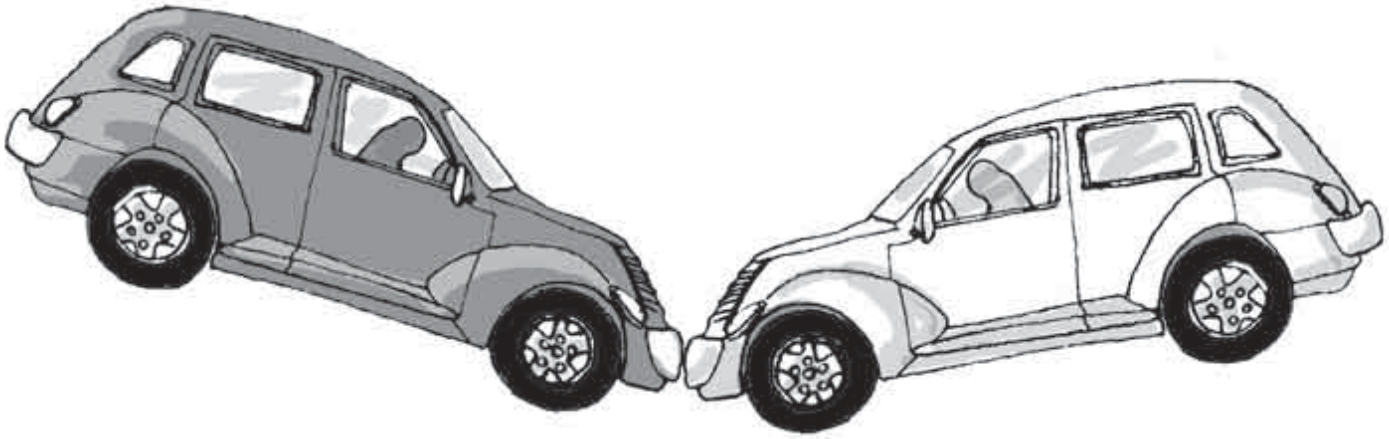
should not be considered a threat by any agency. Many local governments are already doing system processes of SMS and are experiencing positive results. And, officials of those agencies are responding positively to well founded proposals to improve the safety of the highway network with their area of responsibility.

SMS – It's Just Good Business

In safety management, one-size does not fit all. The SMS is flexible so it can conform to the individual agency. Local agencies should tailor the implementation process to consider their individual needs, priorities, goals, and level of resources. The SMS identifies a broad spectrum of considerations from which agencies can choose. Your agency will need to determine for itself which of these can and should be implemented to maximize the use of your safety investment.

SMS can save lives, maybe even your own or that of someone you know. Over 60% of fatalities in this country occur on local roadways. So, implementing an SMS not only makes good business sense, it's the right thing to do. ▲

The Local Agency Safety Management System guide is available through the WST2 Center by calling Dave at (360) 705-7385. It can be downloaded from the Internet at: www.wsdot.wa.gov / ta / T2Center / Mgt.Systems / SafetyTechnology / safety.htm



Third Edition of the "Roads Journalism Awards" by The Spanish Road Association — 2001

The Spanish Road Association (SRA) announces the third edition of its "Roads Journalism Awards." The conditions to participate in these awards are as follows:

First:

- Any kind of journalistic work can compete for the prize, the unique condition is that it refers to roads as its main subject. All the works must have been distributed by any media – press, radio, television, and Internet – between January 2, 2001 and January 1, 2002, inclusive.
- Works distributed by foreign media – press and Internet – can also compete for the prize. They must be about Spanish roads and must have been published within the same time period.
- Works of Journalism students may be submitted. The students must be registered in academic courses during the 2000 / 2001 or 2001 / 2002 academic seasons. In this category, it is not essential that the works have been published.
- Candidates may submit as many items as they wish.
- The jury will specially value the author's contribution to social, cultural, and economic development, or the freedom of movement within a community. The jury will also consider those works that contribute to social awakening in highway safety and those which emphasize the relationship between highways and the environment. Finally, the jury will take into consideration the journalistic quality and skill.

Second:

- Those who wish to compete in the "Roads Journalism Awards" must submit their entries to The Spanish Road Association, 23rd Goya Street, 4th Floor, Madrid 28001.
- Write "Premios 'Carreteras' de Periodismo" on the envelope.
- Entries must be received by January 15, 2002.

Third:

- Candidates must send two issues of the publication in which their work appears, or two legible photocopies accompanied by the cover or the Home Page if it is an Internet site. For radio or television items, send a recorded audio or video tape. All authors must send a photocopy of their passports and a title sheet containing their name, address, telephone number, the title of the entry, the name of the publication, and the date when it appeared.
- Authors whose work has been written in any language other than Spanish and published abroad must also include a translation into Spanish.
- Journalism students must send a certified copy of their registration in 2000 / 2001 or 2001 / 2002 academic courses. All works must be typewritten.
- Submissions will not be returned.

Fourth:

- The jury President will be Mr. Victor Montes Arguelles, President of the Spanish Road Association, who will lead all jury deliberations and votings. The jury will consist of prestigious journalists and specialists in the road sector. Their names will be announced after the prizes are awarded.
- Prizes will be awarded to the author(s) who receive the majority of the votes of the jury members.

Fifth:

- There are four prize categories:
  - Written media (press and Internet): This prize totals 350,000 pesetas (approximately 2,104 euros, or 2,000 U.S. dollars).
  - Audio-visual media (Radio and Television): This prize totals 350,000 pesetas (approximately 2,104 euros, or 2,000 U.S. dollars).
  - Foreign Media (Press and Internet): This prize totals 200,000 pesetas (approximately 1,025 euros or 1,100 U.S. dollars).
  - Students: This prize totals 100,000 pesetas (approximately 602 euros, or 550 U.S. dollars).
- The Jury's decision is final.

Sixth:

- By entry into this contest, contestants accept all of the above conditions and accept the authority of the Spanish Road Association to reproduce and distribute any and all of the submitted work without compensation. ▲

Subsurface Utility Engineering in Washington State

By Jim Anspach, Principal, So-Deep, Inc

What is Subsurface Utility Engineering?

Subsurface Utility Engineering (SUE) is a relatively new interdisciplinary approach to managing the risks that existing underground utilities create on projects involving excavation. Many of these risks are a direct result of inaccurate, incomplete, or imprecise information on the location or existence of existing utilities. Just as important are the timing and distribution of this utility information. Subsurface utility engineering utilizes new and existing technology to collect and manage utility data, and transmits this data to the right parties, at the right times, in order to decrease project risks. SUE is now accepted and promoted by engineering organizations, and federal and state agencies as a means of reducing overall project costs and liabilities.

A pending ASCE standard titled *Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data* defines subsurface utility engineering as:

> A branch of engineering practice that involves managing certain risks associated with: utility mapping at appropriate quality levels, utility coordination, utility relocation design and coordination, utility condition assessment, communication of utility data to concerned parties, utility relocation cost estimates, implementation of utility accommodation policies, and utility design.

An engineer has many sources of information on existing utilities. Utility owner records, public records, private records, interviews with knowledgeable sources, visual site indications, historical books and newspaper archives, surface geophysical information, test holes, and GIS systems are some examples.

...a relatively new interdisciplinary approach to managing the risks that existing underground utilities create on projects involving excavation.

Utility owners keep many different kinds of records. Large-scale transmission / distribution system maps may show the presence of utilities, but because of their scale they may not be horizontally accurate or show details of material type, size, etc. On the other end of the spectrum, there may be field notes made by field personnel during installation or maintenance activities with accurate measurements to existing topographic features. (Although, sometimes those topographic references may be long gone, rendering these drawings less useful for location purposes). Service record cards, valve drawings, and circuit schematics are examples of other kinds of records. These utility records may exist on all kinds of formats, such as mylar, aperture cards, computer files, index cards, wall maps, paper sheets, and so on.

How Do These Records Differ?

There is one obvious difference between these records: Quality! Different types of records have different quality. Some records have very high quality, and tell us everything we need to know about a particular utility at a known point. Other records may have a very low quality, and tell us next to nothing about the utility, other than its potential presence somewhere in the general area.

Until recently, there was no mechanism for engineers or surveyors to differentiate these differences in quality on design or construction plans, or in GIS databases. All utility information was depicted as being the same. The end result of low quality information being portrayed the same as high quality information resulted in all the information sinking to the lowest common denominator of quality, in other words, untrustworthy information.

Engineers and surveyors recognize this and completely disclaim responsibility for utility information that they depict on documents. They attempt to push liability to the utility owner or the constructor. Some court rulings uphold these disclaimers. Others do not. In a Commonwealth of Pennsylvania ruling (PennDot v. I.A. Cataldo), the owner of the construction plans (PennDot)

was found to be responsible for any costs associated with poor or missing utility information on the plans. This prompted the following statement from William D. Pickering, P.E., PennDot State Utilities Engineer, on a 1995 Federal Highway Administration film:

> "In Pennsylvania, the project owner can be held legally responsible for the accuracy of the information on the bid documents. Consequently we want a competent professional to obtain that information for us."

Usually, the finger of blame points everywhere for problems associated with poor utility information and only the lawyers profit. A recent Indiana (Lafayette) court case assessed damages at 30%, 30%, and 40% respectively to the City, the engineer, and the contractor.

How Can Responsibility Be Better Defined?

One of the advantages of applying subsurface utility engineering to a project is that responsibility for wrong or missing utility data on plans is better defined. The subsurface utility engineer becomes individually and corporately responsible for negligent errors or omissions of the deliverables and no longer disclaims utility information, but instead, claims responsibility for it - within certain guidelines. These guidelines involve defining and then obtaining and depicting the "Quality Level" of utility information. In other words, if the engineer can verify that a particular utility depiction on the plans is very accurate, why not say so, rather than disclaim the good information along with the bad? By taking responsibility for data, contractor bids are lowered and there is certainly a better incentive to get right information on the plans.

The American Society of Civil Engineers recognizes that national standards for these quality levels need to be developed and promoted. They have, therefore, formed a national consensus standards activity to draft such standards. Once in place, these standards may influence how the insurance industry and the courts view utility data liability. Membership of the committee includes people from engineering, construction, insurance, utility owners, academia, federal agencies, the military, labor unions, equipment manufacturers, and providers of subsurface utility engineering.

Until recently, there was no mechanism for engineers or surveyors to differentiate these differences in quality on design or construction plans, or in GIS databases.

What are Utility Quality Levels?

It would be quite easy to develop literally hundreds of different quality levels if one were so inclined. However, such a large number would be unwieldy and therefore probably not effective. In developing quality levels, a natural grouping emerged that addressed how data was collected and how that data could be endorsed by a licensed professional.

Quality Level D (QL D) utility data is that information that is collected and depicted on documents that comes solely from utility owner records, or conversations, or indirect visual indications. It is the lowest quality level and everyone should be very careful when using it for any purpose. The only aspect the engineer can be held accountable for is investigating appropriate sources of information and interpreting the records as best as can be done. It has a good application for project planning / route selection, where the planner needs to get an overall "feel" for the utility congestion. An example of its use and pitfalls is as follows: A water record from 1960 shows the water line two feet off the edge of the road, with one valve on the main. The road in 1960 was two narrow lanes; now it is two wider lanes with a turn lane. The engineer plots the water line two feet off the edge of the road, but is not known whether (a) the edge of the road is at the same place now as in 1960, (b) the water record was correct as far as its geometry, (c) the water line is still in service or abandoned, or (d) the water line underwent changes in conjunction with road improvements or other events.

Quality Level C (QL C) utility data is better. It addresses the problem of where the old road edge might be by using the water valve as a survey point. All visible utility structures that indicate a utility below the surface are surveyed to project control and placed on the plans at the right positions. Then, the utility record's geometry can be used to place it on the plans. The water line that would have been plotted two feet off the edge of the road is now plotted through the surveyed water valve. If the water valve is six feet inside the turn lane, then the water line is plotted parallel to the road (following the record geometry) but six feet inside the turn lane. Of course, if the water valve can't be found, this utility can only be plotted to quality level D standards. Quality level C data still does not address utilities for which there are no records, utilities for which the records are wrong or incomplete or not updated, or utilities which

have no visible features that can be surveyed. The survey of the visible utility feature is endorsed by a licensed professional. Liability revolves around the appropriate utility records search, the survey, and the best interpretation of the records information.

Quality Level B (QL B) utility data provides a significant upgrade in quality from QL C data. It involves the use of surface geophysics to identify, interpret and field-mark underground utilities, combined with a survey of the field markings, and subsequent reduction onto plans or into the digital database. There are many different types of surface geophysics that will work under certain conditions to identify underground utilities. The key to liability here is that the appropriate methods be used. Appropriateness of method is part of the professional geologist's or competent engineer's role, along with interpretation of the data, and education of the client for budgetary purposes. The key is to pick those techniques that, given the environmental and site conditions, will give the educated client the best "bang for the buck" in identifying the most, or the most critical, utilities for the project mission. Not all utilities may be found through surface geophysics.

After utilities' approximate locations are marked on the ground surface, the engineer / surveyor references them to project control and reduces them onto plans or into the database. Other information might be interpreted from the surface geophysics, such as approximate depth and utility type. Utilities for which records exist, but which could not be found through the surface geophysics, are depicted at a lower quality level.

In the water record example, if the water line had bends in it that the records did not reflect, the surface geophysics would detect them. If the valve were paved over, the surface geophysics would detect it; survey would place it on the plans correctly. If the water line was abandoned and in poor condition, the surface geophysics might detect the new waterline, and give clues to the condition of the abandoned one.

The Federal Highway Administration has performed widespread studies that show average savings in excess of 462% for every $1 spent in upgrading utility information to its highest necessary quality.

Liability for quality level B data is generally confined to surface geophysics method selection, education of the client, correct interpretation of the surface geophysics, correct marking of the utility on the ground surface, survey of those markings, depiction on the plans or in the database, and evaluation of all appropriate records to see if utilities must be depicted at a lower quality level. The appropriate professional affixes his or her stamp on the deliverables; insurance covers all aspects of the end work deliverables. QL B data is most useful in the preliminary design stage of projects.

Quality Level A (QL A) data is the highest quality. No matter how well the surface geophysics are applied and interpreted, precise information on elevation, size, material type, condition, configuration, and so forth of the utility cannot be verified without exposure. So QL A data is that data that is gathered, surveyed, and depicted through excavation or exposure of the utility. It takes all interpretation out of the utility information at that point. In our water line example, the exact horizontal location, depth, condition and other data at the point where it is needed is gathered.

New excavation technologies such as air / vacuum methods protect the utility from damage during exposure, limit the work zone, and reduce costs. Quality Level A measurement data is endorsed by the licensed professional.

What are the Advantages of Using Quality Levels?

Instead of all utilities depicted the same on a document, those utilities for which better data are available can be portrayed in such a manner that designers and constructors can minimize their impacts. The subsurface utility engineer is responsible for depicting the utilities at the correct quality level, and following the established industry procedures for collecting and interpreting that data. If the engineer makes a negligent error or omission, he or she may become responsible for the resultant problems with design or construction.

Being able to obtain higher quality utility information results in project savings through better design and construction. The Federal Highway Administration has performed widespread studies that show average savings in excess of 462% for every $1 spent in upgrading utility information to its highest necessary quality.

Project owners and utility owners can select the amount of risk they want to underwrite on a project by selecting the quality level of utility information that they procure, or by requiring the project engineer to provide it to them.

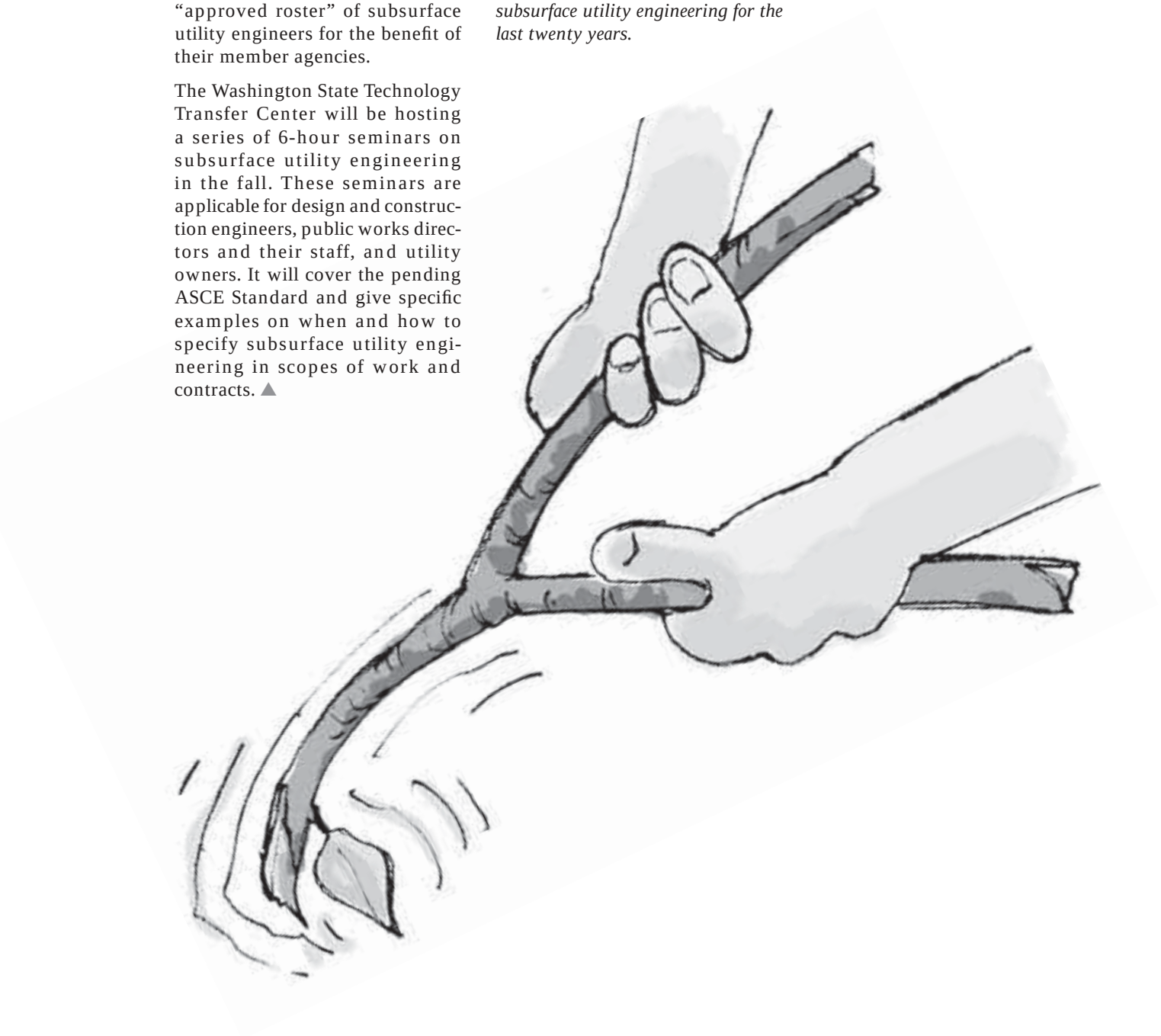
How is SUE Used in Washington?

WSDOT and Transportation Improvement Board (TIB) are actively promoting the use of subsurface utility engineering on their projects. WSDOT has existing task-order contracts in place, and the TIB has issued several policies on the subject. They also have an "approved roster" of subsurface utility engineers for the benefit of their member agencies.

The Washington State Technology Transfer Center will be hosting a series of 6-hour seminars on subsurface utility engineering in the fall. These seminars are applicable for design and construction engineers, public works directors and their staff, and utility owners. It will cover the pending ASCE Standard and give specific examples on when and how to specify subsurface utility engineering in scopes of work and contracts. ▲

About the Author

Jim Anspach is Chairman of the ASCE's Construction Standards Council and Chairman of the ASCE committee writing Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data. He is a Principal with So-Deep, Inc. and has been involved with the creation and development of subsurface utility engineering for the last twenty years.



Save Lives, Lower Injuries, Reduce Property Expenses

By Danielle Duclos, Technical Editor, Foresight Science and Technology

We've all heard the adage — "Be careful or you'll wrap yourself around a utility pole." The National Highway Traffic Safety Administration (NHTSA) reports that in 1999, 69,000 injuries and 1,856 fatalities resulted from vehicle collisions with a pole or post.[1] In Texas alone, 4,580 motor vehicles struck utility poles in 1999, with 53 being fatal accidents, 2,368 injury accidents, and the remaining 2,159 vehicles suffering property damage only.[2] In their Statewide Accident Profile Sheet for 1999, the state of Maryland reported 74 fatalities, 3,389 injuries, and $81.9 million worth of property damage from vehicle collisions with poles.[3] A study by the Federal Highway Administration based on collection and analysis of accident roadway data for over 2,500 miles of urban and rural roads from four states showed that lateral pole offset, traffic volume, and pole density were the factors most highly related to utility pole accidents.[4] Burying power and telephone lines would eliminate the danger, as would relocating poles to a safer location further from the roadside.[5]

Data for over 2,500 miles of urban and rural roads from four states showed that lateral pole offset, traffic volume, and pole density were the factors most highly related to utility pole accidents.

UTD of Virginia has developed the Safety Link, a breakaway device for utility pole guy wires.

Because utility poles are usually privately owned, decisions governing safety are usually by the utilities themselves rather than regulatory bodies. Thus, cost versus liability trade-offs loom large in decisions. Such trade-offs discourage adoption of line burying and pole relocation strategies as well as adoption of innovations such as breakaway poles and crash cushions. Fortunately, new technology makes removing the hazard from guy wires a cost-effective way to limit property and personal damage as well as utility outages due to collisions with poles.

Guy wires help support weaker utility poles during strong storms and high winds, while providing extra support for newer, stronger poles that can stand on their own. But these wires, which run from the pole's top into the ground, pose an extreme hazard to errant vehicles. They seldom break when impacted, leading vehicles to ramp up the wire and roll over, causing fatalities, injuries, and, at the very least, extensive property damage. A more serious problem can arise if the guy wire "pulls" the utility pole on impact. Pulling can make poles sag or snap. Live wires can drop to the ground or land on a vehicle, actually electrically energizing the car or truck. The pole can crush a vehicle.

UTD of Virginia has developed the Safety Link, a breakaway device for utility pole guy wires. A U.S. Department of Transportation-funded technology, which recently gained approval from the Federal Highway Administration for use on the National Highway System, the Safety Link protects poles and vehicles during collisions by incorporating a "weak link" designed to withstand normal tensile loads but fail reliably when subjected to bending moments above a preset threshold. The device does not rely on stress concentration at threads, notches, or scored areas. Rather, release is triggered by mechanical decoupling.

The link proved successful in August 2000 during a testing and evaluation conducted by the Texas Transportation and Research Institute. Nine crash tests involved an 820-kg passenger car impacting four different designs of the device at a nominal speed of 35 km / h and 100 km / h for test level (TL-3)

Safety Link eliminates those injuries and fatalities stemming from ramping up and rolling over….

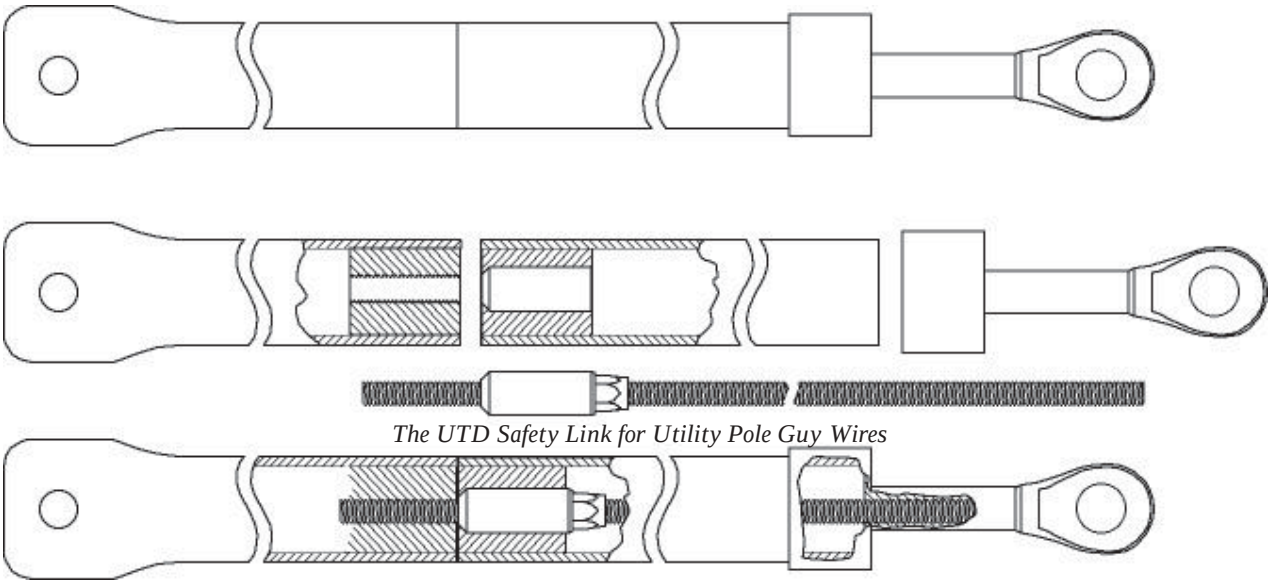
conditions. In each test, the Safety Link yielded upon impact of the vehicle. Damage was limited to denting of the bumper and hood, with windshield contact occurring in only two tests. In one of those tests, localized cracking occurred that would not interfere with the driver's ability to see. Each vehicle remained upright after striking the guy wire.

The Safety Link eliminates those injuries and fatalities stemming from ramping up and rolling over guy wires. Thus, risk to drivers and passengers is greatly reduced and the amount of money paid out by owners, insurance, and utility companies is also significantly lower because vehicle damage is minimal. An added benefit is rapid and low labor cost repair after an accident. Utility crews need only replace the Safety Link and the guy wire is back in service in minutes. For utilities, an added benefit is reduced damage to poles and lines due to accidents involving guy wires.

Promoting road safety means looking beyond the pavement to the world bordering highways. The Safety Link will save lives, and that is what safer roads are all about. ▲

For additional information you can contact Danielle Duclos at danielle.duclos@seeport.com or John Hill, creator of the Safety Link, at JohnHill3@UTDinc.com or UTD Inc., 1042 Battleview, Parkway, Manassas, Virginia 20109.

[1] "Traffic Safety Facts 1999," National Highway Transportation Administration, 1999 Motor Vehicle Crash Data from FARS and GES, www-fars.nhtsa.dot.gov. Statistics are for public roadways.
[2] Accident Records for 1999, Texas Department of Public Safety.
[3] "Fixed Object Stuck - Pole/Statewide Accident Profile Sheet," Maryland State Highway Administration, Office of Traffic and Safety.
[4] Zegeer, C.V.; Parker, M.R., "Cost-Effectiveness of Countermeasures for Utility Pole Accidents," Federal Highway Administration, Washington, DC, 1985.
[5] *Ibid.*



The UTD Safety Link for Utility Pole Guy Wires

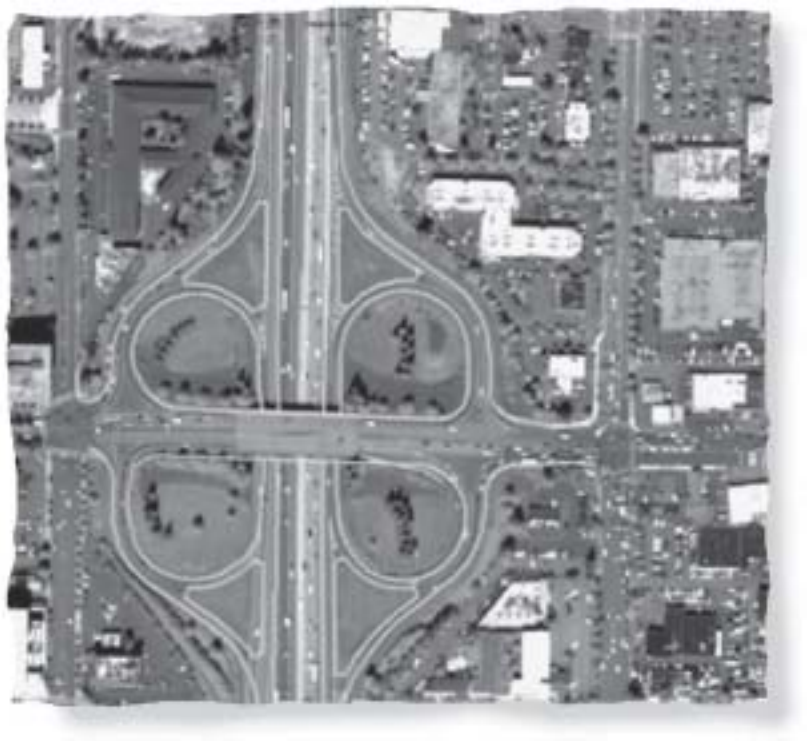
Remote Sensing and Satellite Imagery

By Heather Christopher, Marshall and Associates, Inc.

Remote sensing, simply put, is the observation of an object from a distance. Satellite remote sensing involves the collection of information about features on the Earth's surface by orbiting satellites. The satellites collect information in the form of infrared and visible radiation. The data collected by the satellites is then transmitted to ground stations and can be used to produce a digital image which appears similar to an aerial photograph.

While these images may resemble an aerial photograph, satellite imagery is a more stable platform than airborne acquisitions, and enables significantly more information to be determined about the area of interest. Some of the important differences between satellite imagery and aerial photography are:

- Acquisition of visible and infrared reflectances enable better feature identification and assessment.
- Images are acquired regularly providing access to current and archived data, and straightforward change detection.
- Images have a larger footprint, requiring less image-to-image registration.



The Benefits

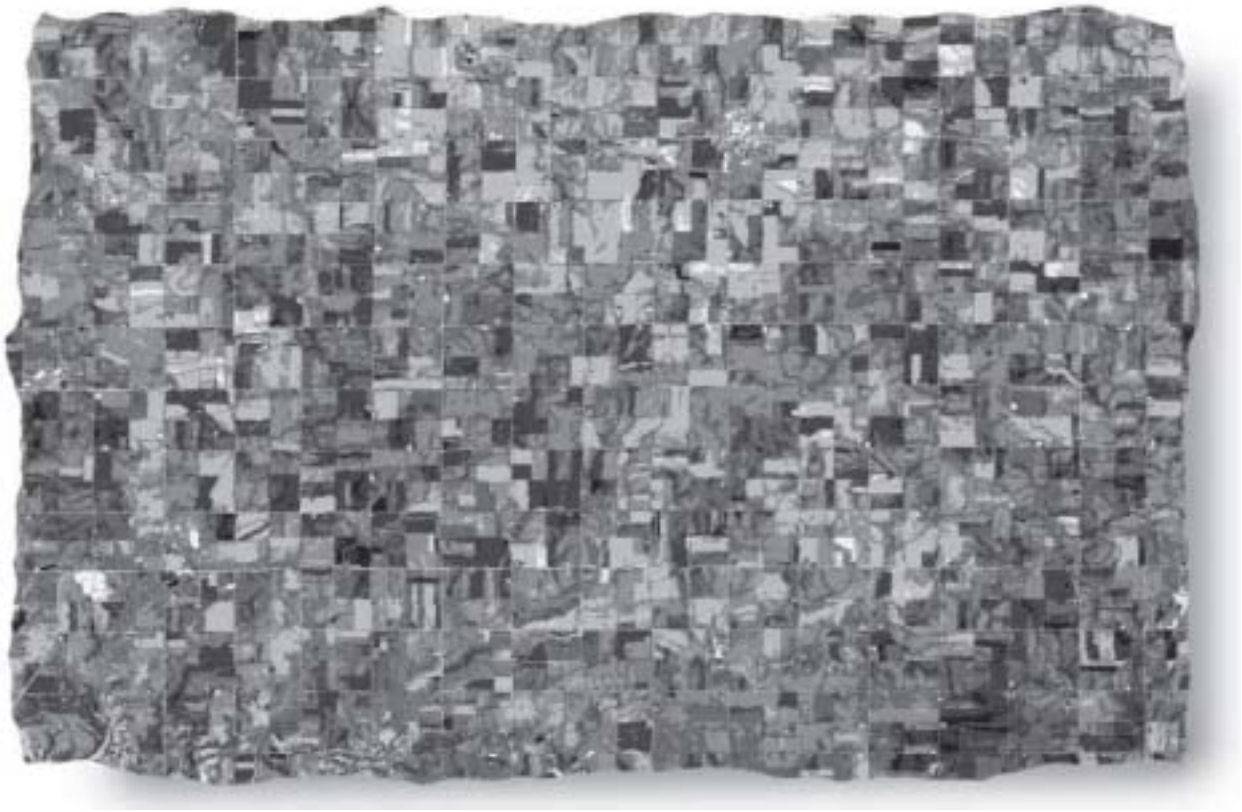
Data collected by satellites is used to provide timely and detailed information, especially in relation to resource management. Satellite data provides a number of benefits including:

- Continuous data acquisition
- Current data
- Broad coverage
- High spectral resolution
- High spatial resolution
- Ability to manipulate / enhance digital data
- Cost effective data
- Map-accurate data
- Large data archive
- Satellite data can be used for a multitude of projects including, but not limited to:
- Vegetation type assessment and monitoring
- Soil surveys
- Map creation and revision
- Thematic map production
- Water resources planning and monitoring
- Urban planning
- Agricultural property management planning
- Crop yield assessment
- Natural disaster assessment

Satellite imagery plays an important role in GIS data acquisition and visualization. First, it helps provide solid visual information. The old adage, "a picture is worth a thousand words", is absolutely true. The second and perhaps more important role of satellite imagery is to provide a method for gathering spatial information about features such as roads, vegetation, water, pervious and impervious surfaces, etc.

Image Processing

Data gathered by satellites is released as plots, glossy prints or digital data products. Inexpensive, easy-to-use software is now available to view, manipulate and analyze the digital data products, giving industry professionals a cost-effective alternative for projects that previously could be accomplished only through expensive, time-consuming, manual interpretation.



...giving industry professionals a cost-effective alternative for projects that previously could be accomplished only through expensive, time-consuming, manual interpretation.

Before information that is useful for a GIS system can be extracted from the satellite data, however, certain image processing techniques may need to be employed.

Image processing techniques can be used to enhance the image to assist in visual interpretation, and to correct or restore images that have been subject to geometric distortion, blurring or degradation by other factors. There are many image analysis techniques available and the methods used depend on the requirements of the specific problem detected.

In Conclusion

Recent events in the remote sensing field have made the acquisition of high spatial resolution digital data a reality for many users. However, this data is not a "magic bullet" solution for all projects and situations.

Recent events in the remote sensing field have made the acquisition of high spatial resolution digital data a reality for many users.

When deciding which satellite data to select for a particular project, many factors need to be taken into account. A thorough needs assessment and in-depth consultation with a remote sensing professional

Satellite Data Categories and Uses

Low-Resolution Data

Typically within the range of $20m^2$ – $4Km^2$ is gathered by satellites such as:

- LANDSAT
- AVHRR
- SPOT
- IRS

The low-resolution data can be used for a variety of projects including:

- Regional growth management
- Regional base mapping
- Landcover classification
- Change detection
- Fire mapping and recovery
- Snow cover mapping
- Flood monitoring
- Regional vegetation mapping
- Regional soil moisture analysis
- Wildfire detection & fuel mapping
- Geologic mapping
- Dust and sandstorm monitoring
- Transportation planning
- Recreation planning
- Land use/cover mapping and planning

Medium-Resolution Data

Typically within the range of 5 – $10m^2$. Examples of satellites that gather medium-resolution data are:

- SPOT
- IRS
- RADARSAT

Medium-resolution data can be used for projects such as:

- Vegetation health
- Crop identification
- Land cover/use
- Soil and geology mapping
- Change detection
- State/County planning
- Natural disaster monitoring
- Mineral exploration / Geology mapping
- Timber and crop mapping
- Hydrology – flooding, soil moisture, snow
- Glaciology
- Near-surface groundwater detection
- Wind and wave measurement
- Ocean and lake bottom terrain features

High-Resolution Data

Typically within the range of $1m^2$ – $4m^2$, is gathered by satellites such as:

- IKONOS - the only commercial satellite capable of capturing images at 1-meter and 4-meter resolution in panchromatic mode.

And by aerial photography systems such as:

- Digital Airborne Imagery System (DAIS) an all-digital aerial image capture system with built-in geometric accuracy.
- Positive Systems' ADAR System 5500 four band multispectral digital aerial photography with resolutions from 0.5 to 3m per pixel.

High-resolution satellite data can be used for a variety of projects including:

- Municipal/Parcel mapping and planning
- Utilities – Automated Mapping/Facilities Management (AM/FM)
- Land cover/use
- Environmental assessment/planning and mitigation
- Recreation
- Real estate
- Cadastral mapping
- Vegetation classification

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can help you decipher the properties of various remote-sensing technologies and can assist you in determining the appropriate data type to use for your particular project.

Satellite imagery alone is not a total solution, but, if used appropriately, it can be a very powerful tool, able to meet a variety of needs and add value to your enterprise-wide GIS. ▲

About the Author

Heather Christopher is the Marketing Administrator at MARSHALL and Associates, Inc., an Olympia-based GIS and remote sensing consulting firm. MARSHALL is a business partner with both Space Imaging and SPOT Image and can offer clients discount pricing on state-of-the-art high-resolution satellite imagery and related services.

USDOT FHWA/NHTSA

GIS Safety Analysis Tools CD-ROM Updated

The GIS Safety Analysis Tools CD-ROM, originally released in 1999 and updated in 2000, has been enhanced again in Version 3.0. These tools were developed and updated as part of the Highway Safety Information System (HSIS) project. Improvements were made to both the applications and the documentation. The most significant enhancements to the applications include:

- Revising several of the original Safety Analysis Tools — Spot / Intersection Analysis, Strip Analysis, Cluster Analysis, and Sliding Scale Analysis — to run using ArcView® 3.2, exclusive of ArcInfo®.
- Updating the GIS Safety Analysis Tools CD-ROM to provide Tool Tips for easier navigation and a graphic user interface for greater functionality.
- Updating the Help files to reflect changes in the GIS Safety Analysis Tools.
- Converting the aerial photo images to MrSid™ format; these images are automatically loaded if the viewer extension is available.

In addition to the changes in the applications, several improvements and additions were made to the documentation available on the CD-ROM, including:

- A revised User Guide which provides configuration and installation information and guidance on the use of the applications.
- A Data Guide which provides more comprehensive details regarding the data requirements of the various applications.
- A research report titled Implementation of GIS-Based Highway Safety Analysis: Bridging the Gap. This report is also available online at www.tfhrc.gov / safety and is intended to serve as an educational document for both safety engineers and GIS professionals who are interested in linking highway safety analysis and GIS capabilities. ▲

The revised GIS Safety Analysis Tools CD-ROM is now available.

For more information about the GIS Safety Analysis Tools CD-ROM or HSIS, please contact Michael Griffith, (202) 493-3316, or e-mail mike.griffith@fhwa.dot.gov.

Reprinted from Research & Technology Transporter, May 2001, FHWA-RD-01-012.

Charlie Jenson's Snowplow Bit Changer

By Wendy Schmidt, WST2
Assistant Editor

Smashed fingers, sore muscles and twisted knees were the motivating factors behind an invention by Charlie Jensen, Maintenance Tech. II of the WSDOT Twisp Maintenance Shop in North Central Region. Charlie's snowplow "bit changer" began as "kind of a picture in my head" and became a device that converts changing bits on snowplows and graders from a 40-minute job involving heavy lifting to a safer and easier 20-minute undertaking. Jensen's Supervisor, Linda Dougherty, submitted the invention to the Washington State Technology Transfer Center as a "Better Mousetrap". It was selected as one of this quarter's "Better Mousetraps." A special recognition certificate, baseball cap, congratulatory letter, and a Highways & Local Programs coffee mug goes to the inventor.

During the winter months, the three carbide steel bits on the bottom edge of snowplow blades need to be removed and replaced every 4 or 5 weeks. Each bit weighs about 50 lbs. Usually, a person lifts a bit in to place with one hand and rests it on his knee or a wood block while slipping the bolts into place with the other hand, frequently resulting in pulled muscles, twisted knees, and smashed fingers. The 7-foot long, 150 lb. grader bits require a similar installation effort with a two-man crew. Charlie's bit installer lifts bits into place with minimal human effort in half the time. It's like an extra set of hands on wheels! It makes the job of changing bits a lot easier!

"Charlie Jensen with a bit ready to install." (Photo by Jeff Adamson)

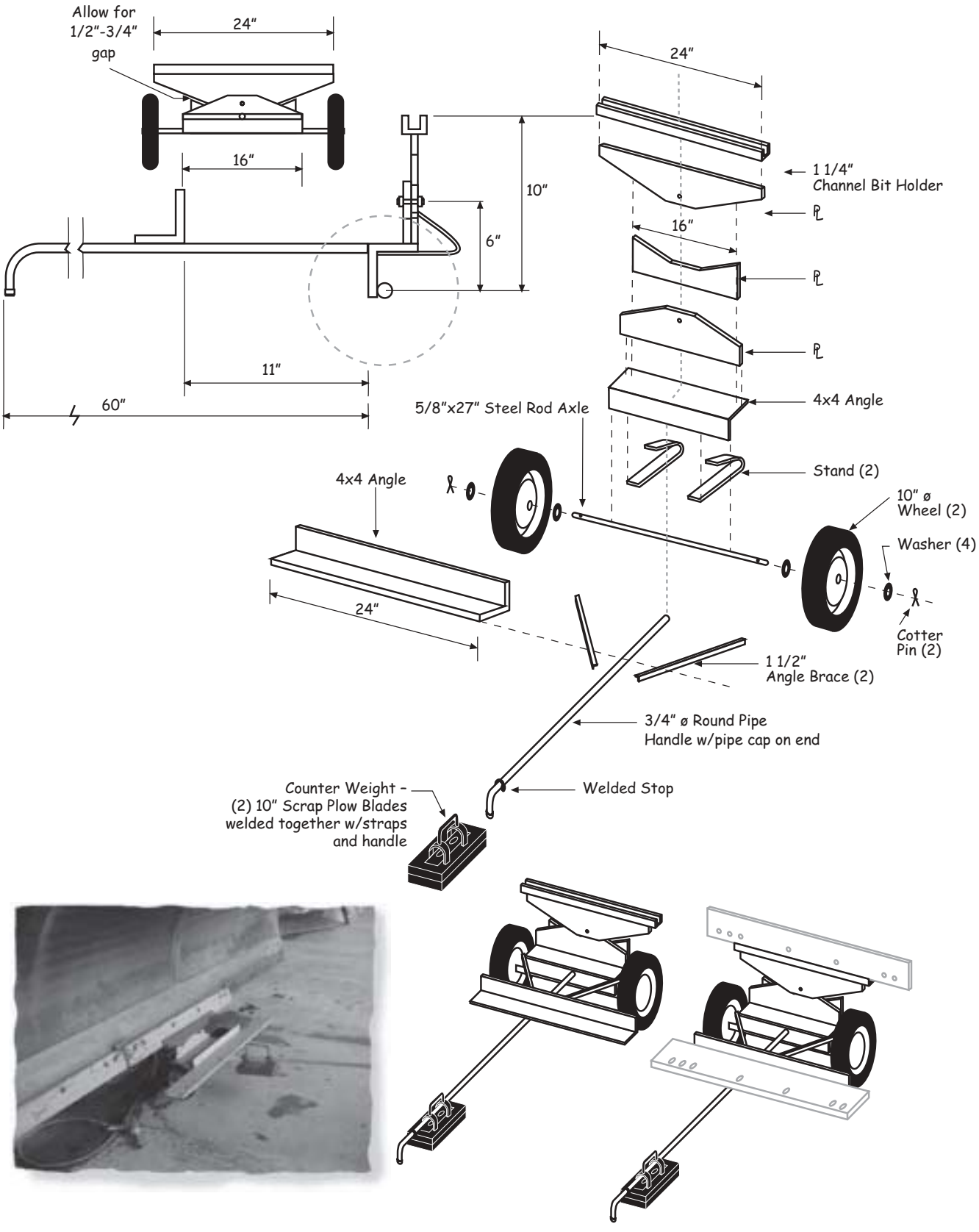
Jensen's bit changer resembles a hand truck. "The only things I had to buy were the wheels," Charlie said, "the rest of the parts came out of the scrap bin." It is designed on the principle of a fulcrum point and weight. The bits are balanced by a counterweight that slides up or down the handle to raise or lower the plow bit. A blade is placed in a holder above and in front of the wheels. The holder swivels about an inch so the plow blade doesn't have to be lined up square.

When the holder is rolled up to the face of a snowplow blade, the counterweight is slid up the handle length. The farther up the handle the counterweight goes, the higher the holder containing the plow bit rises. The handle is bent downward at the far end to provide a "third foot." When the holes on the bit line up with those on the plow blade, the operator is free to insert the bolts—all without having to lift the bit! The counterweight has its own handle to make sliding it easy!

The device also has a handy carrying table made of a 2 foot long section of 4-inch angle iron, which is welded on the handle side of the wheels. It will carry all three bits needed in a single trip from the supply pallet. Diagonal braces of $1^{1/2}$-inch angle iron provide support for the handle. ▲

For more information, you may contact Charlie at (509) 997-3081.

A special thanks to Jeff Adamson, Communications Manager WSDOT North Central Region, in Wenatchee, for his contribution to this article.



"A steel bit in place for installation."

Errol Rhode's Snowplow Emergency Light System

By Dan Sunde, Director, WST2 Center

During snowplow operations the WSDOT South Central Region Maintenance Office identified a serious safety problem. When the operators turned on their flashers to make their plows visible to other drivers on the road, the turn signals and brake lights were difficult to see. With two rotary beacons on the cab, alternating flashers in the tail lights and the running lights all turned on at the same time, the snow plows were highly visible but the brake lights and turn signal lights would get lost in the myriad of lights. This made it difficult for other drivers to see when the plows slowed down, prepared for a turn, or changed lanes. One safety feature was hindering another. To add to the problem, snow would build up on the lights, requiring them to be cleaned off regularly.

Errol Rhode, mechanic for WSDOT South Central Maintenance Shop in Yakima, came up with a very effective solution. Errol developed a light bar assembly that mounts high on the back of the hopper with a switch connected to the plow's brake and turn signal system. The switch turns the alternating flashers off for 2 seconds whenever the brakes are applied or the turn signals are used. This alerts the surrounding drivers that a change is occurring and isolates the plow's brake lights and turn signals.

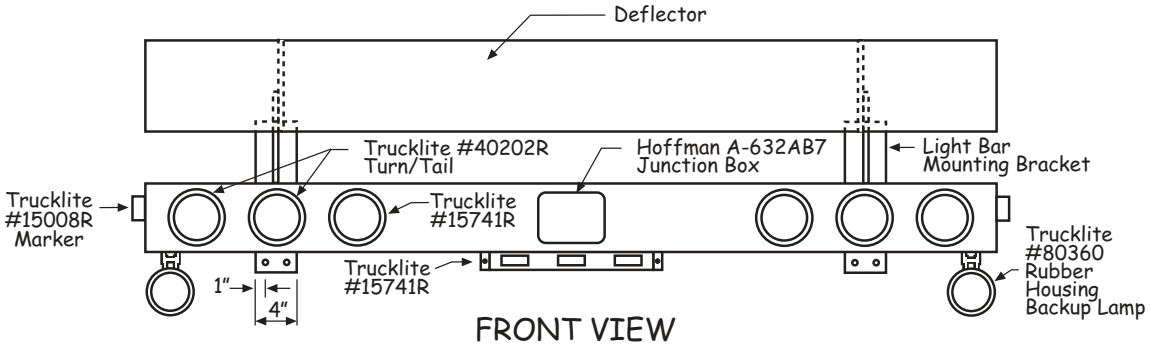
The heart of the light delay system is the weathertight junction box mounted at the center of the stainless steel light bar. It contains an adjustable relay set for a 2-second delay and an alternating flasher unit wired to the snowplow's standard 7-wire trailer cable through a ten-pair terminal strip.

Errol stands beside a completed light bar and air foil assembly.

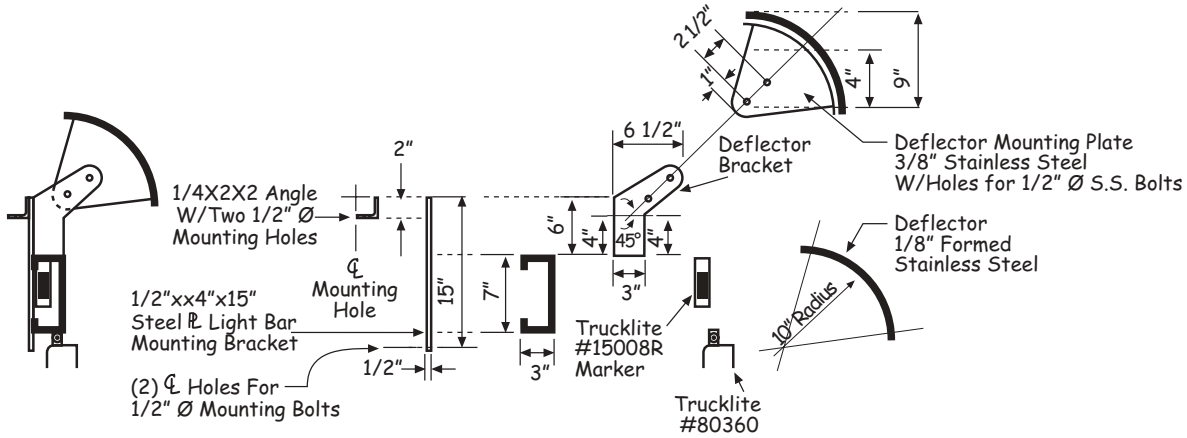
Errol also designed an air deflector that blasts air over the face of the lights, that effectively keeps snow from accumulating on them. Both the lighting and air deflector assemblies are fabricated from stainless steel and are mounted high to prevent corrosion.

The system has been so successful that the design is now standard on the entire South Central Region snowplow fleet. Hoppers are ordered without lights. The light bar and airfoil assemblies are fabricated in the WSDOT SCR Maintenance Shop and added to the hoppers. (See photos.) ▲

For additional information you can contact Errol at (509) 577-1975.

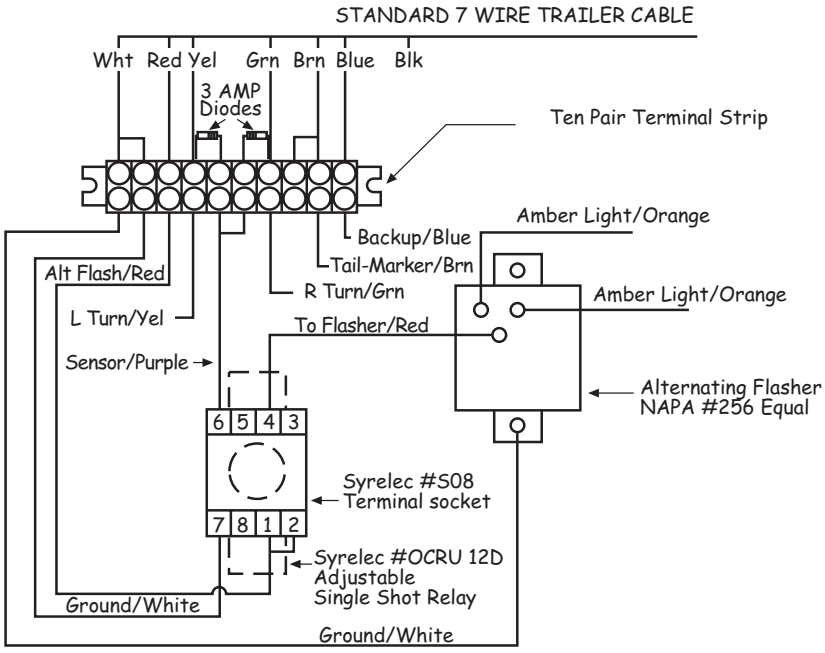


FRONT VIEW



END VIEW

Junction Box Wiring Diagram



2001
Pacific Northwest
Transportation
Technology Expo

Got a "Better Mousetrap"? Bring it to the Expo!

September 12 & 13, 2001

The WSDOT Field Operations Support Service Center (Maintenance Office), WST2 Center and FHWA are cosponsoring the second Pacific Northwest Transportation Technology Expo at the Grant County Fairgrounds in Moses Lake, Washington, on September 12 & 13, 2001. The purpose of the Expo is to demonstrate the leading edge technologies currently available on the market, as well as innovative "home grown" ideas for roadway operations developed by Pacific Northwest state and local agency transportation operations staff members.

A major part of the Expo will be set up for demonstrations and displays of practical tools, equipment modifications and new techniques we are calling "Better Mousetraps," developed and used in the field by public agencies. No idea is too small. If it works and saves you time and money, we invite you to share it with the rest of the agencies in the Pacific Northwest. This will be one big two-day "show-and-tell" to share your ideas and see what others like you have done to be more efficient and effective.

Attendance, registration and display space are free to public agencies. We have plenty of space. Just let us know what your innovation is and how much space you need. We'll make the arrangements to get you a site. If possible, we encourage the actual inventor be at the display to field questions and demonstrate your "Better Mousetrap."

Get more information at:

WSU Conferences & Professional Programs
P.O. Box 645222
Pullman, WA 99164-5222

1-800-942-4978 or (509) 335-3530
Fax 509-335-0945

E-mail: *wsuconf@wsu.edu*

BUILD A BETTER MOUSETRAP
WST2

"Better Mousetrap" Submittal Form

BUILD A BETTER MOUSETRAP WST2

The "Better Mousetrap" is awarded each quarter for the most innovative working ideas presented by a public agency and published in WST2

Award:
The best concepts will be published in the WST2 and posted on the WST2 Web Page.

Published mousetraps will receive a "Better Mousetrap" baseball cap and certificate.

Published mousetraps will be included in competition for the annual "Crystal Mouse" award.

Eligibility:
Washington State Public Agencies.

Mail To:
"Better Mousetrap"
WST2 Center Transportation Building
P.O. Box 47390
Olympia, WA 98504-7390

E-mail:
WST2Center@wsdot.wa.gov

For questions:
Dan Sunde, Director of Technology Transfer
SundeD@wsdot.wa.gov
(360) 705-7390

Name of the "Better Mousetrap":

Submitter's Name:

Title:

Agency:

E-mail Address:

Address:

City: State: Zip+4

Phone Number : ( )

Developer's Name(s):

Title:

Agency:

E-mail Address:

Address:

City: State: Zip+4

Phone Number : ( )

Description of the "Better Mousetrap"

Why was it necessary?

How does it work?

How was it built? (Include Sketches, Photos, Drawings)

How does it perform?

Please add a sketch with dimensions and materials used!
We will draw plans from them so others can build it too!

A Whack
On the Side of the Head

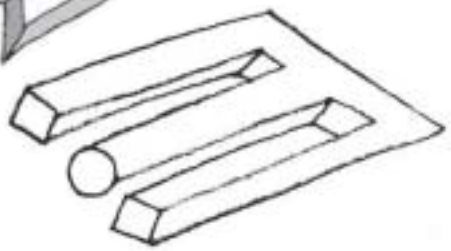
By William C. Evans, Local Technical Assistance Program (LTAP) Manager, USDOT FHWA

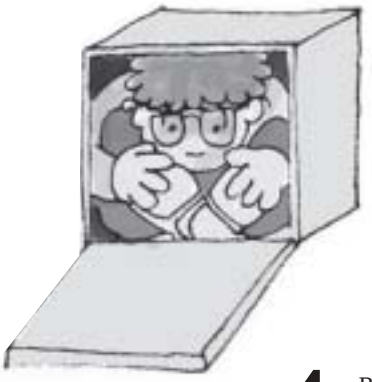
Roger Oech's books have interesting names and creative titles. He is one person who believes that humans can consciously develop their creativity. He then carries on to tell how it should be done. (As I was trained in engineering – not your most creative of pursuits, I have always to wanted to become more creative)

Dr. Oech says that most of us have "mental locks" that keep us from creative thinking. Ten of these are:

1. The right answer syndrome — This is big problem in engineering education…Once I get one answer, that must be the right one. I don't need to look for any more answers.

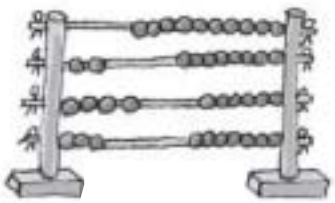
2. That is not logical — This will end all hopes of creative thinking.





3. Follow the rules — Picasso said, " Every act of creation is first of all an act of destruction."

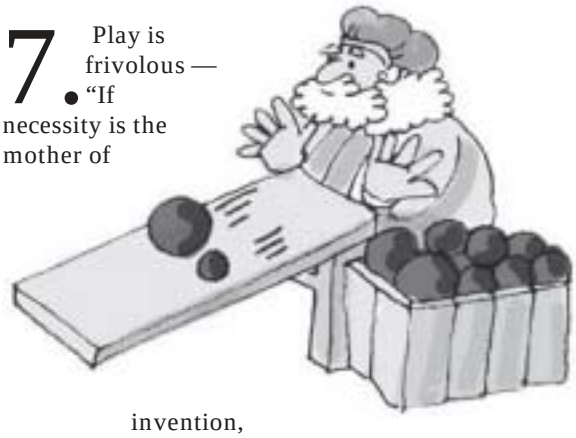
4. Be practical — What if our streets, highways and cars were smart? Never happen (We would have no Intelligent Transportation Systems, ITSs)

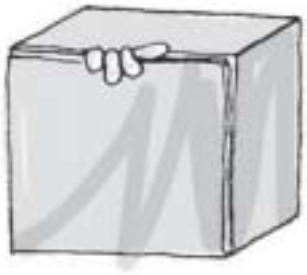


5. Avoid ambiguity — Professor Niels Bohr said, "How wonderful that we have met with a paradox, now we have some hope of making progress"

6. To error is wrong — Do not get me started here — this is why we do "research" — to find out what works and what does NOT. We have to make mistakes to learn —— what we really need to do is to learn to make mistakes faster, so we can learn faster.

7. Play is frivolous — "If necessity is the mother of invention, then play is the father." The next time you have a problem, play with it. If you do not have a problem, take time to play anyway. Maybe you will come up with a great new idea!





8. That is not my area — Something we always have to look out for. We need to look for ideas that cross natural boundaries. LTAP has never had this problem to my knowledge...

9. Do not be foolish — Advisors to ancient kings were often "yes men" — they told the king what he wanted to hear. The king knew that that is was not a good way to make decisions. That was the fool's job — he had a license to do this — to parody any proposal under discussion. The fool's jokes whacked the king's thinking and forced him to examine his assumptions. In this way, the king protected himself from group-think and generated new ideas.

10. I am not creative — (Heard this one anywhere recently?) "Once upon a time, two frogs fell into a bucket of cream… The first frog, seeing that there was no way to get any footing in the white liquid, accepted his fate and drowned.

The second frog did not like that approach. He started thrashing around in the cream and doing whatever he could to stay afloat. After a while, all of his churning turned the cream into butter and he was able to hop out."

Moral: If you swallow a live green frog, the first thing in the morning, nothing worse is likely to happen to you that day – and the frog will not drown in cream!

Dr. Oech says we break out when we think freshly about a problem – when we let our minds float. Typically, from our subconscious, out pops a creative thought. Sometimes this does not happen and we may need to be whacked:

- A whack could result from getting a low evaluation or worse, getting fired.
- Many get whacked by a serious illness.
- A whack could happen as a result of traveling and seeing new things – maybe a wilderness experience
- A whack might happen when you find out that the nerd in your class has become a multi-millionaire through speculating in the commodities market (or designing a new computer system)
- A whack could be a joke:

  Q: What is Beethoven doing now?
  A: Decomposing

- Or, a whack could come with a sunrise after staying up all night.

So, creativity does matter and you can be creative. You are creative – every day of your lives. Enjoy!! ▲

Regional Road Maintenance Endangered Species Act Program Guidelines

By Roy Harris, Maintenance and Operations Supervisor, City of Everett

There is a lot of interest in the Regional Road Maintenance Endangered Species Act Program Guidelines. "What is this program," and "How was it developed" seem to be the two questions that are reoccurring.

In May 1999, the Puget Sound Chinook salmon was listed as "threatened" under the Endangered Species Act (ESA). In December 1999, the bull trout was also listed as "threatened" in the Puget Sound region. In response to these listings, local governments in the Puget Sound area formed a coalition known as the Tri-County ESA Response Effort, with the objective of responding to the listings by implementing programs to aid in the conservation of listed species. Road Maintenance is one of these program areas.

The Tri-County Group, now known as the Regional Road Maintenance Technical Working Group, developed these ESA Program Guidelines in order to achieve conservation outcomes when doing road maintenance work. The Regional Road Maintenance Technical Working Group is a team of road maintenance managers and technical staff from local agencies. National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) worked with the regional group to ensure that the proposed program appropriately addresses conservation issues. Other regulatory authorities, as well as Puget Sound area tribes, environmental interest groups, and business groups, also provided input and assistance.

These guidelines will be reviewed and approved by NMFS and USFWS. These guidelines are intended to serve as a model program that, if approved, local jurisdictions could adopt and implement in order to qualify for a take limit under the ESA 4(d) rule for threatened salmonids. There are three parts to the proposed Regional Road Maintenance ESA Program Guidelines:

- Part 1 is the basic model program consisting of ten program elements. They are: (1) Regional Forum, (2) Program Review and Approval, (3) BMP's and Conservation Outcomes, (4) Training, (5) Compliance Monitoring, (6) Scientific Research, (7) Adaptive Management, (8) Emergency Response, (9) Biological Data Collection, and (10) Bi-annual Reports. Implementation of each of the ten program elements is required for a local agency to obtain a take limit under the 4(d) rule.
- Part 2 contains detailed best management practices (BMPs) for road maintenance crews, supervisors, environmental support staff, engineering design personnel, and managers.
- Part 3 is an individual agency application for 4(d) take limit. Part 3, known as the "Plug and Play" element of the program, allows local jurisdictions to "plug" into the model program (Parts 1 and 2) to receive 4(d) coverage. Part 3 is a commitment that a jurisdiction will comply with the ten program elements contained in Part 1.

Detailed information about how the program works is contained in Part 1 of these guidelines. The process for individual agency program review and approval for 4(d) coverage is contained in Program Element 2 of Part 1.

Program Element 4: Training

Training is one of the most critical elements of the Regional Program. Training questions have been a hot topic for people evaluating how to provide training for their staff. "What, if any, training is available" is the question most often asked. Training efforts will initially focus on the BMPs, assuring that crewmembers, supervisors, engineers, and environmental staff involved in road maintenance work have or will receive training to appropriately and effectively implement BMPs. New employees will be trained in program elements in areas for which they are responsible.

The two goals of training are to ensure crew members, supervisors, technical staff, and environmental staff (1) understand the

Regional Road Maintenance ESA Program, and (2) are aware of their roles and responsibilities in terms of field work, technical support, permits, and implementation. Training will be conducted with an adaptive management philosophy, with future needs addressed as questions and issues arise during program implementation.

The purpose of the training program is to:

- Provide training to Road Maintenance personnel involved with making decisions, designing, constructing, and / or maintaining facilities impacted by the ESA.
- Develop and provide a comprehensive training curriculum.
- Meet the various "Regional" members' training needs.
- Adapt to changing technologies, training methods, and feedback from trainees.
- Include oversight techniques to evaluate the effectiveness of the training.
- Keep records of staff attending training courses.
- Make training available.
- Provide consistent training courses to Regional Program members and staff.

WSDOT's Highways and Local Programs Service Center administers a statewide transportation management, engineering, operations, and road maintenance training program through its Washington State Technology Transfer Center (WST2). This Regional Road Maintenance ESA training will be folded into their existing training program. Training will be accomplished with both classroom training and train-the-trainer sessions. An important part of the training program will be a train-the-trainer component where individuals identified by the local agency will be trained to present the program to their road maintenance personnel. ▲

The Guidelines can be downloaded from: http: / / www.metrokc.gov / roadcon / bmp / pdfguide.htm

Want More Information?

If you would like to talk with someone about this program, contact one of these individuals:

Roy Harris, City of Everett
(425) 257-8893

Kathy Brown, King County
(206) 296-8138

John Schnaderbeck, Pierce County
(253) 798-6295

Sandy Stephens, WSDOT
(360) 705-7853

Partnering Success for Highway 12

By Leonard Pittman, WSDOT South Central Regional Administrator

One major success for Washington State Department of Transportation's (WSDOT) South Central Region is Highway 12 between SR 124 and SR 730. This project has long been favored by the local agencies but there were no means available to make it a success. However, in the 1997 Supplemental Transportation Budget WSDOT received $275,000 to partner with Walla Walla County, city of Walla Walla, and the Port of Walla Walla. Eventually, Walla Walla County became the lead on the Surface Transportation Program (STP) Grant application, and four basic deliverables were achieved:

1. A footprint was developed for Highway 12 between SR 124 and SR 730 to determine traffic and other impacts.
2. An Environmental Assessment was performed.
3. A plan ready contract (or plans, specifications, and estimate) was prepared for Phase 1 of 4.
4. A second footprint was developed on Highway 12 from SR 730 to Walla Walla.

One major success for Washington State Department of Transportation's (WSDOT) South Central Region is Highway 12 between SR 124 and SR 730.

The partnerships now include 14 separate entities, both public and private. The partners' financial involvement and the successful STP grant leveraged over $1,000,000 for the above work. An additional $6,250,000 is identified in the 2001-03 Current Law Budget for this project, with a potential $6,975,000 becoming available in future bienniums through the Freight Mobility Strategic Investment Board (FMSIB). The 14 partners are:

- WSDOT
- US Army Corps of Engineers
- Walla Walla County
- City of Walla Walla
- Port of Walla Walla
- Benton-Franklin Council of Governments
- Valley Transit
- City of College Place
- Boise Cascade Corporation
- Association of Western Pulp and Paper Workers
- Good Roads and Transportation Assn.
- Soil Life Systems, Inc.
- Specialty Minerals
- Cargil Grain, Inc. ▲

For more information contact Todd Trepanier, Manager, Planning and Programming Management, WSDOT South Central Region: (509) 577-1626 or e-mail TrepanT@wsdot.wa.gov.

Partnerships Enhance Community Benefits

By Brent Rasmussen, WSDOT Eastern Region Local Programs Engineer

Washington State Department of Transportation's (WSDOT) Eastern Region has formed partnerships with its local community customers to help them build rest room facilities. WSDOT supplied funds to the communities of Union Town, Palouse, Davenport, and the Tiger Store to assist in building rest room facilities in landscaped areas usually connected to a city sewer system and maintained by the local agency for the life of the facility. The communities benefit from the number of people who travel to these areas to shop or relax while enjoying all that the community has to offer. ▲

Registration Online
Local Agency Guidelines (LAG) Training Coming To A Computer Near You

By Darlene Sharar, Standards and Procedures Engineer, WSDOT H&LP

The following is a listing of proposed LAG training that you will be able to register for online! Some of the titles may change, but the content area should remain the same. A number of the courses will be offered fall 2001:

- Funding
- Section 106
- Consultants
- Certified Testers
- Right of Way Workshop
- Advanced Environmental
- Construction Documentation
- Introduction to Environmental
- Design Standards from PS&E to Award
- Disadvantaged Business Enterprise (DBE) / EEO / OJT
- Railroad, Emergency Relief and Enhancement Program Procedures

The website address for online training registration: *http://www.wsdot.wa.gov/TA/Operations/LAG/LAGprotrain.HTM*.

To register, select the course that you are interested in attending ... it will take you to an "on-line" waitlist registration form. Fill out the form and submit it electronically. You will be notified when a class has been scheduled.

The basic yearly training cycle will be from fall to spring (normally there will be no classes scheduled during the summer; however if a specific need arises, a summer class will be considered). ▲

For more information on any upcoming LAG classes, please e-mail Darlene Sharar at ShararD@wsdot.wa.gov *or give her a call at (360) 705-7383.*

Words from the Chair

Hello, everyone. Well, here we are again right in the middle of another construction season and if you're anything like me, you're being pulled several different directions at once with tasks that demand your attention. While it certainly is very rewarding to deal with some of our long-standing pavement problems, it does make the summer season seem to disappear right before your eyes. Oh well, it all comes with the job.

In that same vein, time is growing short for the approach of our next big event the Fifth International Conference on Managing Pavements, which is being held jointly with the NWPMA Fall Conference. This is an exciting and perhaps once in a lifetime opportunity to attend a truly international conference with our peers in the pavement management community. The theme for this conference is "Closing the Gap between Vision and Reality" with the areas of focus being integrating PMS with transportation asset and infrastructure management, ensuring a PMS continues to meet agency needs, collecting and analyzing PMS data, applying PMS information to construction and maintenance programs, and adopting and using innovative approaches.

This is an exciting and perhaps once in a lifetime opportunity to attend a truly international conference with our peers in the pavement management community.

In addition to the international conference theme there will be presentations by Bill Whitcomb from the city of Vancouver and George Alton from Ada County, Idaho on the history of the NWPMA and how the Ada County Co-op Road District was formed and functions respectively. These presentations will be offered several times during the conference. Also, the 2001 Pavement Manager of the Year Award will be presented at the Bell Harbor Gala. If you were interested in attending this exciting event I would encourage you to register soon and take advantage of the hundred dollar discounts available to the first twenty-five NWPMA members to register. After July 25th the registration cost increases by one hundred dollars for all registrants.

We are also looking for participants in the NWPMA's Condition Survey Review Committee. As busy as we all are this time of year, this is an important issue to the local agencies in Washington. Bill Whitcomb is the chair of this committee and I know he would appreciate your involvement in this process. You can learn more about this effort by contacting either Bill or myself or Bob Brooks at the T2 Center.

Well, back to the alligators again. I hope you all have an enjoyable summer and I look forward to seeing you in Seattle in August at the Fifth International.

Bill McEntire, President

By Bob Brooks, Pavement Technology Engineer, WST2 Center

Small City Pavement Preservation Program — Round II

The purpose behind the Small City Pavement Preservation Program (SCPPP) is to establish and promote an on-going pavement maintenance program, using a pavement management system designed to maintain the condition of the streets in this state's small cities at an average pavement condition rating (PCR) of 65. This is the optimum level to provide the most cost-effective pavement maintenance program through the application of low-cost, preventive maintenance treatments.

To accomplish this goal, the legislature established the SCPPP and funded it at $5,000,000 for the 1999-2001 Biennium. This program is truly targeted at the small cities within the state, those with a population of 2,500 or less. The state's smaller cities have very limited resources, both in terms of dollars and people, to devote to maintaining their city street networks. The addition of a grant program targeted to small city street preservation has proven to be very popular, as you might expect, and is a very successful program as well.

Not only were the small agencies able to receive a grant for up to $50,000 to apply preventive maintenance treatments to their street networks, but they were also introduced to the concepts of pavement management. To qualify for the grants the small agencies were required to evaluate and rate their street networks using StreetWise, a simplified pavement management system or an equivalent system. For many small agencies this was their initiation to formalized pavement management. While it certainly is wonderful to see the small cities receive a much-needed influx of cash to improve their networks, in many ways the adoption and use of a pavement management system will yield even greater benefits in the long term.

...the state's small cities have been able to provide an improved level of service to their citizens.

Last biennium, under this program 98 small cities with a combined population base of 100,000 were able to qualify for and receive grants. This resulted in nearly 100 miles of city streets receiving some form of preventive maintenance treatment. This is work that would not have otherwise been accomplished and with early intervention the longevity of those miles of pavement has been greatly extended. Through this program the state's small cities have been able to provide an improved level of service to their citizens.

With the beginning of the new biennium on July 1, 2001 we begin Round II of the SCPPP. The new biennium brings some refinements to the program to reflect the lessons learned during Round I. Following are the highlights of the program changes for this biennium:

- The grant amount has increased from $50,000 to $75,000 per project per city.
- Eligible street width has been reduced from a 20-foot minimum to a 16-foot minimum. This will enable many more small city streets to qualify.
- Pavement rating sheets for a small city's entire network must be on file before a grant application will be processed.
- All in all the SCPPP offers many long-term benefits to our states small communities.

If you would like to receive additional information on the SCPPP please contact: Bob Brooks, Pavement Technology Engineer, Washington State Technology Transfer Center, 360-705-7352, brookbo@wsdot.wa.gov.

Portland Cement Concrete Pavement Intersections — Rapid Reconstruction Saves Time and 40-Year Headaches

By Bob Brooks, Pavement Technology Engineer, WST2 Center

The state of Washington has experienced an on-going problem with some of its asphalt concrete pavement (ACP) urban intersections that are subjected to severe distress from slow moving truck traffic and warm temperatures. This has resulted in severe rutting. Depths of 2 inches or greater have occurred that require the need for intervention and rehabilitation of these intersections.

A typical PCCP has a design life of 40 years and requires no periodic intervention because the rutting problem does not reoccur.

The standard approach to rehabilitating these intersections has been reconstruction with ACP to improve the structural condition and then milling and inlaying with ACP to correct rutting as it reoccurred. The milling and inlaying process to rehabilitate the intersections may be required at intervals of 8 years or less. Disrupting traffic flow and business during these interventions is very unpopular with the public and often results in complaints and feeling of ill will toward the department.

To solve this need for periodic pavement rehabilitation, one solution is to reconstruct the intersections with Portland Cement Concrete Pavement (PCCP).

A typical PCCP has a design life of 40 years and requires no periodic intervention because the rutting problem does not reoccur. However, there are two main concerns with reconstructing urban intersections with PCCP: the initial cost and the potential disruption to traffic patterns. The WSDOT South Central Region developed an innovative construction approach that addresses both these concerns.

The solution used by WSDOT was accelerated pavement reconstruction using PCCP at three intersections in Kennewick, Washington. Long disruptions to traffic flows and business were minimized by allowing the construction of the approach and leave legs to occur under traffic then closing the entire intersection from Thursday evening to Monday morning to allow the contractor complete access without traffic to complete the work. This approach allowed the construction to be completed in a much shorter period of time.

The reduced construction time and traffic exposure helped to keep the overall costs down as well. The initial reconstruction with PCCP will likely be more costly than ACP reconstruction. However, taken over the 40-year design life, PCCP reconstruction once versus ACP reconstruction with periodic milling and ACP inlays to correct rutting compares quite favorably.

The real key to the success of this approach is communication and cooperation.

The real key to the success of this approach is communication and cooperation. Well before the construction started and right through to completion and opening back up to traffic, all the affected parties were brought into the process. These parties included, but were not limited to, local governments, fire and police agencies, business owners, the contracting community, affected property owners and the local media. Weekly meetings open to anyone interested in the construction process were held and all parties were encouraged to express their concerns. Where practical, ways to mitigate these concerns and accommodate the necessary construction were developed and implemented. Communication with the affected parties and the public was extensive and paid big rewards.

Not only were businesses and the public more tolerant during construction with much fewer complaints but as much as 30% of the normal intersection traffic found different routes or otherwise avoided the intersection and detours during construction.

This approach is an excellent choice for consideration by counties and larger cities for selected problem intersections. A long-term solution to continued intersection rutting can be achieved with minimum inconvenience to the public and at competitive life cycle costs. Look for more detailed information on accelerated PCCP intersection reconstruction in upcoming issues of the WST2 newsletter.

Not only were businesses and the public more tolerant during construction with much fewer complaints but as much as 30% of the normal intersection traffic found different routes…

Source: PCCP Intersections Design And Construction In Washington State, WA-RD 503.1, Final Report May 2001 by Jeff S. Uhlmeyer, P.E., Pavement Design Engineer, Washington State Department of Transportation. ▲

For further information you can contact Jeff Uhlmeyer at (360) 709-5485 or e-mail UhlmeyJ@wsdot.wa.gov .

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Standards

By Jennifer Boteler, Librarian

Even though I've only been in the WSDOT Librarian position for one month, I've noticed that the type of information requests I receive from local transportation officials often involve technical standards. To help in identifying the titles and numbers of standards, and the issuing organization, here is a selective listing of web links, arranged by frequently requested standard organizations, mega sites, and places to order copies of standards.

AASHTO — *http://www.transportation.org/aashto/home.nsf/FrontPage*
Follow link for "Bookstore," then you can search for publications by keyword or browse titles alphabetically.

ASCE — *http://www.asce.org/publications/books.cfm*
Click on "Browse by Subject" link at top of page, then scroll down and pick "Standards."

ANSI — *http://webstore.ansi.org/ansidocstore/find.asp?*
In the "Standards Search" box, enter number, name, or keywords to search for a standard.

ASTM — *http://www.astm.org/cgi-bin/SoftCart.exe/STORE/store.htm?E+mystore*
Several options to search for standards are included.

Mega Sites

Ultimate CE Directory : Building Codes and Standards USA
http://www.tenlinks.com/engineering/civil/standards/international/usa.htm
Listing of top links to web sites of building codes and standards.

Southern Building Code Congress International
http://www.sbcci.org/SBCCINEWS/Links.htm
Very comprehensive site. Includes links to standard organizations, model code organizations, federal agencies, state and local sites, and testing labs and inspection agencies.

Sources to purchase Standards

Global Engineering Documents — *http://global.ihs.com/*

NSSN — A National Resource for Global Standards *http://www.nssn.org/index.html*
ANSI affiliated. You can also search for standards on this web site, and there are links to federal agencies that promulgate standards.

For assistance in navigating these web sites, or help in obtaining standards, please feel free to contact me at *BoteleJ@wsdot.wa.gov*. ▲

2001 Annual Traffic Safety Awards Program

Safety Superstars

Call for entries

The Washington Traffic Safety Commission seeks statewide nominations for the 18th Annual Traffic Safety Awards Program.

Winners will be honored for their traffic safety innovations at a luncheon ceremony in December.

Please join us!

Awards Program Thursday, December 6, 2001

WestCoast Olympia Hotel (formerly the Westwater)

Award Categories

Business leadership
For companies that have taken a leadership role in fostering improved traffic safety.

Community/Government program leadership
For city, county or neighborhood programs (or projects which draw membership from government and the private sector), which address traffic safety problems in unique and efficient ways.

Citizen activist
For individuals who have demonstrated outstanding effort in promoting safe roadways, or who have successfully brought public attention to a roadway safety problem or issue, or who have successfully brought disparate groups together to solve a traffic safety problem.

Legislative leadership
For elected officials who have demonstrated exceptional personal involvement in reducing traffic problems or promoting strong laws which support safe roadways.

Media awareness
For exceptional coverage of traffic safety issues.

Educational outreach
For an educational institution, service group, government or nonprofit organization that has demonstrated outstanding effort in forming an effective education program or citizen involvement effort to promote safety.

Youth initiative
For a young person or organized youth group that has successfully promoted safe roadways.

The judiciary
For people who work in (or with) the judicial system who have demonstrated unusual commitment in the area of traffic safety education, prevention, arrest, prosecution and (or) adjudication.

Law enforcement
For law enforcement personnel who have developed innovative techniques used to detect and (or) deter traffic law violators or who have demonstrated a strong commitment to traffic safety.

Engineering
For individuals or groups that have demonstrated outstanding success promoting engineering solutions to roadway problems.

Traffic records
For outstanding efforts to promote a greater understanding of traffic safety issues through data collection.

Lifetime of Achievement
For a person who has demonstrated outstanding commitment to roadway safety over a period of many years.

Special Director's Award
For outstanding efforts to promote traffic safety objectives with a project, program or work effort.

Entries must be received by 5:00 P.M. on Tuesday Sept. 25, 2001

Questions? Call Jonna VanDyk, Washington Traffic Safety Commission, (360) 586-0297

Rules

Who is eligible?

Any individual, group, business or government organization in Washington State, or any individual or group within such organizations.

WTSC employees are not eligible.

Entries must be submitted to the Washington Traffic Safety Commission by: 5:00 p.m., Tuesday, Sept. 25, 2001.

A copy of this entry form must accompany the nomination.

A nominator may only nominate a person or group once.

Mail to:
Washington Traffic Safety Commission
Attn.: Jonna VanDyk
P.O. Box 40944
Olympia, WA 98504-0944

Entry Form

To enter, please answer the following questions. Please be thorough and print or type clearly:

1. Award nominee name (person, organization, project title).
2. If this is an organization, name a contact person.
3. Nomination category (See list on opposite page. For example, law enforcement.)
4. Nominee's street address, city, state and zip code.
5. Nominee's telephone and FAX number.
6. Describe the program or work effort that the nominee has been involved with, including its goals.
7. The most important question you will answer is: Why does this person or organization deserve an award?

   Describe the innovations and (or) outstanding elements of this person or project. What have been the results of this work effort? Explain any limitations or special challenges faced. How did the nominee overcome these challenges?
8. The second most important question the judges will consider is: Is the nominee performing these activities as part of his/her normal job duties? If so, how has this nominee demonstrated traffic safety achievements above and beyond the normal call of duty?
9. Submit support materials. Please send pictures, slides, copies of news articles, posters, brochures and videos. S.A.S.E. – if you want the items returned submit a return envelope, self-addressed and stamped.
11. List two people who can substantiate the information you have provided. List their name, address and telephone number.
12. Nominators: Please list your name, address and telephone number (the nominator is the person submitting this application). ▲

By Roger Chappell, WST2 Technology Integration Engineer, WST2 Center

A Picture is Worth a Thousand Words . . . And More!

If a "picture is worth a thousand words'" then what are a thousand words worth? I guess it all depends on who wrote the thousand words and what they base their image interpretation on. In this issue I hope to examine this question on the worth, or value, of imaging data.

In the last issue we covered some of the basics of GBI (Ground Base Imaging) and Thurston County's new mobile imaging platform. I also hope you've had a chance to read John Tull's article, "Photogrammetry Product and Processes – Things You Should Know" in the same issue. In this edition of the WST2 you will find a good article on space-based imaging written by Heather Christopher, entitled "Remote Sensing and Satellite Imagery." These articles were designed as a sample of ground, air and space-based imaging to give you a "taste" of what imaging can do for you. In future editions I hope to get into LIDAR, GPR (Ground Penetrating Radar), robotic camera systems and some of the other emerging technologies. For now, it is safe to say, if you can see it you can image it… and then some.

GPS, a Laser Rangefinder and a Digital Camera

There are a few other emerging imaging technologies of special interest to the transportation industry that I would like to mention before we move on. The first of these imaging processes uses GPS, laser range finding and a digital camera. At this point I am not aware of an acronym or fancy name for this process, but I am sure some clever person will think something up to describe it. This imaging process can be used to create 3D image models in CAD-type programs. For now, I'll call it Spatial Image Modeling. A couple of uses for these models include Design Visualization and Seismic Event Modeling.

The process involves using a digital camera to take pictures from various locations around the structure. As you move around the structure taking pictures, you record match points in the image using a GPS receiver and a laser rangefinder. The type of GPS receiver and procedures you use will determine precision of the points that you collect. The laser rangefinder gives you the ability to get multiple positions from a single location. These GPS points will serve to build a "wire frame" model or object in your CAD software, onto which you can "drape" your image. These GPS reference points can be used to build a 3D modeled object or simply to define three-dimensional space as in a "virtual world."

…you can create a model image of a structure similar to the one that you want to build and place it at a predefined location within another image.

In the case of design visualization, you can create a model image of a structure similar to the one that you want to build and place it at a predefined location within another image. There can be substantial advantages to building and testing "things" in a virtual environment before committing the actual resources.

Before proceeding I need to add the caveat you often hear on extreme sports shows, "these stunts were done by professionals! Don't try these at home"! Being

a "do-it-yourself" kind of guy, I figure if "they" can do it, so can I. The bottom line is, you can do it yourself in most cases, but some of these new applications may be harder and more resource demanding to accomplish then they look. I just want to temper the enthusiasm of individuals like myself, by saying that there is a good reason why there are so many imaging professionals in this business. Many of the available imaging products are quite technically sophisticated and can be quite expensive. It can be tricky balancing between what "I" can do and what I can get through hiring an imaging professional. Whether you do it yourself or hire the work done, the more you know about the technology and what you want to accomplish with it, the better the end result is going to be. I have seen many people try to implement technology just because they thought it was cool. Most of them ended up with mediocre or disastrous results. Most of the disasters that I have seen and war stories I've heard can't be blamed on the technology itself, but rather on over extension of the person's capabilities and resources. The payoffs on the road of technology can be great, but it is often a hard and bumpy road to travel.

Digital Panoramic Photography

The next imaging technology that I would like to highlight in this issue is much easier than spatial image modeling. It is the use of digital panoramic photography. One of the best applications of this technology I have seen was done by Hans Cregg for Thurston County.

Hans took a series of ten slightly overlapping digital photographs with a digital camera mounted on a tripod located in the middle of an intersection, each picture looking outward from the intersection. As he worked his way around a 360° circle on the tripod, he overlapped each adjacent frame about ten percent. When he returned to the office, he was able to quickly "stitch" these photos together, using off-the-shelf software.

The result was a continuous image that provided a view of the surrounding area from the center of the intersection.

The result was a continuous image that provided a view of the surrounding area from the center of the intersection. By scrolling the image left and right and up and down the viewer can see in any direction. The software also provides the ability to zoom in and out to see features that may be of interest. Now you can sit in your office and "virtually" stand in the middle of the intersection (with nobody trying to run you over).

The software that Thurston County used also has a feature called "hot spot." Hot spots allow you to click on an image in the photo and have it take you to a new location, much like hyperlinks on a web page. For example, with a hot spot placed on a traffic control box (and the supporting images), you could "virtually" walk over and look inside the box by clicking on it. This could then be linked to a database that details each of the components inside.

This has lead to further experiments using GPS to locate the camera position so the images can be displayed in a GIS.

The capabilities of each software application vary and the specific task you want to accomplish will help determine which one you select. Some software applications allow you to add "hot spots," some produce a 180°, 45° or variable degree panoramic. The software used by Thurston County produced cylindrical images. This produces an image that is like standing in the middle of a circular room with wall sized pictures projected on the inside of the wall all the way around. Some software applications produce spheroidal panoramics. This type of image is like standing in the center of a hollow ball with the image projected on the inside surface. In contrast to a cylindrical image, a spheroidal image allows the viewer to see ninety degrees above and below the horizontal focal plane. The last type of panoramic image is some form of cube, square or rectangle. These may or may not contain a top and bottom image.

There are advantages and disadvantages to any of these images. The challenge is finding the combination that works best for you. For example, spheroidal images tend to require the use of a special camera lens, but tend to need only 1 or 2 pictures to complete the final image. This may have the added benefit of smaller overall file size. If you are interested in the demonstration projects done for Thurston County you can contact Hans Cregg at *Hcregg@aol.com*.

Value of Image Data

So, why the hubbub about taking images of everything? The reasons are as varied as the myriads of applications that do imaging. But, the one thing they all have in common is images are a very data-rich environment.

> ***If just an average picture is worth a thousand words, then what is an image with some intelligence built into it worth?***

If just an average picture is worth a thousand words, then what is an image with some intelligence built into it worth? This is an interesting topic. How do you ascribe worth to an image? Does it have worth because it keeps your personnel out of harms' way? Maybe it enables your engineers to be more productive at "visiting" locations without needing to actually go into the field. Maybe it gives you a perspective that you could not see from the ground. There are many immediate payoffs for choosing imaging as a data collection medium. The bottom line is this: an image itself is data, hundreds and thousands of pixels of data. Every time an image is viewed, those pixels of data are being interpreted, and in a sense another thousand words are generated.

More often the data is used and more accurate the interpretation, the more value or worth the image has.

Reusability of image data

An image is a snapshot of data at a point in time that can be reused indefinitely and for a surprisingly wide variety of uses. For example, in dealing with the GMA (Growth Management Act) people are scrambling around trying to get their hands on all the historic images they can find. Were the original images developed with GMA in mind? No, but they are now being used for this new specific purpose many years after they were taken. These data sets of information, frozen in time, may yield remarkable long-term value in the future as well.

Geo Referencing

Geo Referencing also adds value to your image data.

Geo Referencing is the process of tying the image, or points within the image, to a known position on earth through a referencing system. There are many ways to do this, but no matter which method

> ***Geo Referencing is the process of tying the image, or points within the image, to a known position on earth through a referencing system.***

you choose to use make sure it is documented and can be repeated. Keep in mind, you are recording data or an event that occurred at some distance from the recording device (camera). In some applications you may need to geo-reference the event location rather than the location from which the image was taken.

Portability and Storage

The digital world is constantly changing. The longer the image data is available and more portable it is, the more it will be used. Usability equals worth. If an image becomes archived in a format that is irretrievable, its usability is lost.

> ***…documentation of the image data content and its purpose is essential.***

You may need to think about a migration path to new formats as part of your long-term archival strategy.

Along with a good plan for both long and short term image storage and retrieval is the need for a distribution plan. Who are your customers and how will you deliver the product to them? Some images are very large and difficult to transport from machine to machine. Do you sacrifice image integrity by using compression software? How many varieties of formats are you willing or able to support? Do you need to protect the images from changes or uncontrolled reproduction? You may need to incorporate some form of "watermarking" for copyright protection. This only scratches the surface of the logistics of image handling. Whether or not protecting your images from change by some unknown end user adds value to your product, I will leave up to you to determine.

Image data interpretation

Just because a picture is worth a thousand words doesn't mean the message it is intended to convey is received accurately. Anyone can look at a picture and come up with a thousand foolish words. It takes an additional element to assure an accurate image interpretation. This

element may come in the form of documentation or metadata. Metadata simply stated is just data about data. In this case, the data is an image and the metadata is the supporting documentation.

Because of the wide variety of image data collection methods and data uses, documentation of the image data content and its purpose is essential. Metadata helps provide guidance on how the imaging product was created and the use for which it was designed. The more in-depth the metadata is, the more accurate its interpretation will be, and the more likely it will be used properly. Metadata adds value to the finished product by enhancing its reusability. Without metadata, all you have is a pretty picture and no one really knows for sure why you took it. By default you have left that open for interpretation.

I hope you find the information in this series helpful.

As a parting note I'd like to let you know about a data-sharing project I am working on. At the time of this writing, I am in the process of building a website for data sharing. WST2 is developing a site that we hope will provide a forum for agencies to collaborate on sharing data and working together to get the most out of our geospatial projects. By working together we will be able to lower the cost of projects and increase the usability and value of current products.

Be watching for the new web page at: *www.wsdot.wa.gov/ta/t2center/Mgt.Systems/InfrastructureTechnology/InfaThp.html*

If you would like to participate in this project, please contact me at:

Roger Chappell
(360) 705-7539
ChappeR@wsdot.wa.gov ▲

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This order form is available on the WSDOT Homepage at:
http: www.wsdot.wa.gov/TA/T2Center/T2PUBS.htm

Check the items you would like to order.

- ☐ 1999 Audio Visual Catalog, T2Center
- ☐ Asset Management Primer, FHWA, 1999
- ☐ Asphalt Seal Coats, WST2 Center (1999 Reprint)
- ☐ Asphalt Pavement Repair Manuals of Practice, SHRP, 1993
- ☐ Comparison of Three Compactors Used in Pothole Repair, CRREL, 1984
- ☐ Contracting for Professional Services in Washington State, MRSC, 1994
- ☐ Engineer's Pothole Repair Guide, US Army Corps of Engineers, CRREL, 1984
- ☐ Family Emergency Preparedness Plan, American Red Cross, et al.
- ☐ Financing Federal Highways, FHWA, 1999.
- ☐ Fish Passage Through Culverts, FHWA, USDA, 1998
- ☐ Fly Ash Facts for Highway Engineers, FHWA July 1986
- ☐ Geotextile Selection and Installation Manual for Rural Unpaved Roads, FHWA - 1989
- ☐ Getting People Walking: Municipal Strategies to Increase Pedestrian Travel, Rhys Roth, Energy Outreach Center
- ☐ Gravel Road Test Sections Insulated with Scrap Tire Chips, CRREL 1994
- ☐ A Guide to the Federal-Aid Highway Emergency Relief Program, USDOT, June 1995
- ☐ A Guide for Local Agency Pavement Managers, NWT2 Center, 1994
- ☐ A Guidebook for Residential Traffic Management, NWT2 Center, 1994
- ☐ A Guidebook for Student Pedestrian Safety, KJS, 1996
- ☐ A Guide for Erecting Mailboxes on Highways, AASHTO, 1984
- ☐ Highway/Utility Guide, FHWA 1993
- ☐ Improving Conditions for Bicycling and Walking, FHWA, 1998
- ☐ Improving Highway Safety at Bridges on Local Roads and Streets, FHWA, 1998
- ☐ Innovative Materials Development and Testing Volume 2: Pothole Repair, SHRP, NRC, 1993
- ☐ International State-of-the-Art Colloquium on Low-Temperature Asphalt Pavement Cracking, CRREL, 1991
- ☐ Local Agency Safety Management System, WSDOT, 1998, Reprinted 2000
- ☐ Local Low Volume Roads and Streets, ASCE, 1992
- ☐ Maintenance of Aggregate and Earth Roads, WST2 Center (1994 reprint)
- ☐ Manual of Practice for an Effective Anti-icing Program: A Guide for Highway Winter Maintenance Personnel, FHWA, 1996
- ☐ New Generation of Snow and Ice Control, FHWA
- ☐ Pavement Surface Condition Field Rating Manual for Asphalt Pavement, NWPMA, WSDOT, 1999
- ☐ Problems Associated with Gravel Roads, FHWA, 1998
- ☐ Pedestrian Facilities Guidebook, WSDOT, 1997 ($12.00 outside Washington State)
- ☐ Pothole Primer – A Public Administrator's Guide, CRREL, 1989

- ☐ Rating Unsurfaced Roads, A Field Manual for Measuring Maintenance Problems, CRREL
- ☐ Recommendations to Reduce Pedestrian Collisions, WSDOT, December 1999
- ☐ Redevelopment for Livable Communities, Rhys Roth, Energy Outreach Center, 1995
- ☐ Scrap Tire Utilization Technologies, NAPA, 1993
- ☐ Sidewalk Details, WSDOT, 2000
- ☐ State-of-the-Art Survey of Flexible Pavement Crack Sealing Procedures in the United States, CRREL, 1992
- ☐ Superpave System – New Tools for Designing and Building More Durable Asphalt Pavements, FHWA
- ☐ Technology Information At Your Fingertips, A Directory of Information Resources for Improving Transportation Technology - FHWA
- ☐ Traffic Calming: A Guide to Street Sharing, Michael J. Wallwork, PE, 1993
- ☐ Use of Scrap Rubber in Asphalt Pavement Surfaces, CRREL 91-27
- ☐ Utility Cuts in Paved Roads, Field Guide, FHWA, 1997
- ☐ W-Beam Guardrail Repair and Maintenance, FHWA

Workbooks and Handouts from WST2 Center Workshops:

- ☐ Flagging Handbook, ATSSA, 1999
- ☐ Handbook for Walkable Communities, by Dan Burden and Michael Wallwork
- ☐ Highway Maintenance Welding Techniques and Applications, Tom Cook, Cornell Local Roads Program, 1995
- ☐ Historic and Archeological Preservation: An Orientation Guide, FHWA/NHI
- ☐ Planning and Implementing Pedestrian Facilities in Suburban and Developing Rural Areas, TRB
- ☐ Part Vl Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations (MUTCD) FHWA, September 3, 1993
- ☐ Pavement Maintenance Effectiveness/Innovative Materials Workshop Participant's Handbook
- ☐ Snow & Ice Control Chemicals, Theory & Practice, Dale G. Keep, Ice & Snow Technologies, LLC,
- ☐ Wetland Evaluation Technique (WET), Volume II Methodology, U.S. Army Corps of Engineers, 1993

Non-Credit Self-Study Guides:

These non-credit self-study guides are available through WSDOT Staff Development, and may be obtained from the WST2 Center. An invoice will be sent with these non-credit course materials.

- ☐ Basic Surveying, $20
- ☐ Advanced Surveying, $20
- ☐ Contract Plans Reading, $25
- ☐ Technical Mathematics l, $20
- ☐ Technical Mathematics ll, $20
- ☐ Basic Metric System, $20

Computer Programs :

The following computer programs may be downloaded from the Internet at: *www.wsdot.wa.gov/TA/Operations/Environmental/Soft.htm*

HyperCalc — A shareware utility for converting between metric and English units

APWA Cad Symbol Standards and Menus — A public domain program of standard AutoCAD symbols developed by the Washington Chapter of APWA for use with AutoCAD release 12.

Download the 2001 FileMaker Pro STIP program at *www.wsdot.wa.gov/TA/STIP/STIP.HTM*.

STIP Too Application (Version 5.4 – July 10, 2001) — This program enables you to manage your Six Year TIP (Transportation Improvement Plan) and send it to your MPO/RTPO and/or your Regional Local Programs Office for inclusion into the STIP (Statewide Transportation Improvement Program).

On Screen Forms:

- Progress Billing Form (Excel)
- Local Agency Agreement (Form 140-039)
- Local Agency Agreement Supplement (Form 140-041)
- Federal Aid Project Prospectus (Form 140-101)
- Environmental Classification Summary (Form 140-100
- Bid Proposal Package
- Safety Management System Application
- BRAC Funding Application

Manuals:

- A Local Agency Guide to Pavement Management/Streetwise Manuals
- The Local Agency Guidelines (LAG) Manual
- The Local Agency Safety Management System Manual
- The STIP Too version 3.3 manual

The following computer program may be downloaded from the Internet at: *www.wsdot.wa.gov/fossc/mats/Apps/EPG.htm*:

Everseries Pavement Analysis Programs: This series of programs contains three independent modules:

1. **Evercalc 5.0** – A FWD Pavement Moduli Backcalculation Program
2. **Everstress 5.0** – A Layered Elastic Analysis Program
3. **Everpave 5.0** – A Flexible Pavement Overlay Design Program

Important: These programs are updated on a regular basis. Please send your e-mail address to sivanen@wsdot.wa.gov to be included in the mailing list for updates.

The following computer program may be downloaded from the Internet at: *www.wsdot.wa.gov/fossc/mats/pavement/fwd.htm*:

FWD Area Program - This program is useful in calculating Normalized Deflections Area Value, and Subgrade Moduli from FWD Data. ▲

Regional Road Maintenance Endangered Species Act Program Guidelines and Training Update

By Roy Harris, Maintenance and Operations Supervisor, City of Everett

One of the purposes of the Regional Road Maintenance ESA Program Guidelines and the training program is to provide a consistent regional program which can be adopted by any agency wishing to seek coverage under the routine road maintenance limit approved by NMFS under the 4(d) rule.

The right-of-way (ROW) structure includes planned, designed, engineered and constructed features that together encompass many systems. An understanding of this ROW structure, and its relationship to water quality and habitat, is critical to the successful implementation of the Regional Program.

Examples of systems within the road ROW structure include the following: roadway, drainage, sediment containment, retention / detention, water, sewer, gas, electrical, street lighting, traffic loops and traffic signals.

The surface, or aboveground area, of the ROW consists of the roadway, shoulder, cuts, fills, ditches, channels, dikes, bridges, retention / detention, swales, and constructed wetlands (both intentional and incidental). The road surface directs water from the road, across the gravel or grass shoulder, across the inslope of the ditch, through the ditch, to a swale / retention / detention area, and then to an outlet.

The sediment transport system is the same as the stormwater system. The process is to remove sediment before it outfalls to a watercourse or stream. The drainage system has built-in stormwater retention capacity. The road surface traps large amounts of fine material, where it can be removed by sweeping operations, preventing sedimentation in watercourses or streams. Gravel and grass shoulders filter and trap sediments. Ditches hold and trap sediment (frequently acting as long, narrow retention / detention ponds). Stormwater retention / detention facilities, and constructed wetlands hold and trap large amounts of sediment, reducing downstream sedimentation. The open drainage system is designed to trap sediment: maintenance removes sediments before they pass through the system to a stream or watercourse.

An enclosed drainage system also starts with the road surface or structure and then directs water and sediment to inlets, catch basins, manholes, vaults, pipes and retention / detention facilities. Similar to the open drainage system, the enclosed drainage system transports sediment and has built in trapping and holding areas where sediment can be removed before it gets to a stream or watercourse. Inlets to the enclosed drainage system limit the size of sediments and hold sediments. Catch basins, manholes, vaults, pipes and retention / detention / wetland facilities trap large quantities of sediments so they can be removed before they enter the outflow.

The success of the Guidelines and the training are dependent upon all of the following:

- Understanding the reason for the Guidelines and the BMPs.
- Understanding the concepts presented in the Guidelines.
- Understanding how the BMPs can be useful in daily operations
- Effectiveness of training in BMP selection, installation, monitoring, maintenance and removal.

The intent of the Guidelines is to be outcome based. Installing a BMP may not always meet all of the purposes. The work site

and BMPs must be monitored and maintained. If the BMPs do not produce the desired outcomes, modifications to those BMPs (or additional BMPS to be used in combination with the existing BMPs) may be required.

It is important to read the entire Guidelines to gain a basic understanding of how BMPs can be useful in daily operations. The Guidelines will be the training manual for the classes that have been developed. The training program will combine the reasons, concepts and purposes of the Regional Program with the selection, installation, monitoring and maintenance of BMPs. ▲

Listed here is a summary of the courses that were developed by the University of Washington's Civil and Environmental Engineering Department. The Washington State Technology Transfer Center will begin implementation of the program subject to final approval by National Marine Fisheries Service and U.S. Fish and Wildlife Service, after the public comment period.

The eight courses fall into four categories: An introduction to ESA for decision makers; a track of four courses for technical staff, supervisors and leads; a track of two courses for field crews; and a train-the-trainer track for agencies who want to train their own staff. Courses may be combined into two or three day sessions so that people can complete their entire track in one training session.

Summary of Courses
for the Regional Road Maintenance Endangered Species Act Training Program

ESA 100 "Briefing for Decision Makers"
2 hours. An overview of the Regional Road Maintenance ESA Program and its benefits to participating agencies. For management and administration.

ESA 101 "Introduction to the Regional Road Maintenance ESA Program"
4 hours. For all trainees. This class is a prerequisite for ESA 102-107. Includes an overview of the program:
- Habitat and the Law
- The 10 Elements of the Regional Program
- Introduction to the Guidelines

ESA 102 "Outcome-based Road Maintenance for Field Crews"
8 hours. Instruction in using the Guidelines. Applied exercises in using Guidelines to make informed decisions in the field. Prerequisite ESA 101. For field crews.

ESA 103 "Design and BMPs with the Regional ESA Program Guidelines"
8 hours. Instruction in how to use the Guidelines in multi-disciplinary teams that design, install, monitor and maintain, and remove BMPs. Applied exercises in using the Guidelines for road maintenance design. Prerequisite ESA 101. For technical staff, supervisors and leads.

ESA 104 "Monitoring for the Regional Program"
4 hours. Detailed instruction in the two types of monitoring required under the Regional Program. Applied exercises in monitoring. Prerequisite ESA 101. For technical staff, supervisors and leads.

ESA 105 "Environmental Roles and Responsibilities in the Regional Road Maintenance Program"
4 hours. Detailed instruction in the role of permitting and other environmental issues. Prerequisite ESA 101. For technical staff, supervisors and leads.

ESA 106 "Train the Trainer: Teaching the Regional Program"
8 hours. Instruction in applying the Regional Road Maintenance ESA Program Guidelines. Includes overview of training materials and adult learning techniques. Coaching and applied exercises. Prerequisite ESA 101. For key technical staff, supervisors, leads.

ESA 107 "Train the Trainer: Field Application of BMPs"
8 hours. Instruction in field training techniques using the Regional Road Maintenance ESA Program. Morning session includes instruction in tools and techniques for teaching BMPs. Afternoon session covers field practice applying techniques. Includes coaching and peer evaluation. Prerequisite ESA 101. For key technical staff, supervisors, leads. ▲

Washington State T2 Center

Contact: Wendy Schmidt or Laurel Gray
phone: (360) 705-7386, fax (360) 705-6858
web: www.wsdot.wa.gov/TA/T2Center/train2.htm

To register for a class in this category, use the information listed above.

Prices are public agencies/non-public agencies.

The APTS Mobile Showcase

September 11, Grant County Fairgrounds, Moses Lake. **Free to public agencies/$150 non-public agencies**. This class is offered one day prior to the Pacific Northwest Transportation Technology Expo to be held September 12-13. Instructor: Dr. John Collura, professor of Civil and Environmental Engineering at Virginia Tech. The class will showcase the technologies on the bus which will be present for the Expo. The course will focus on the use of in-vehicle and out-of-vehicle technologies employed in the design of: traffic signal priority systems (TSPS), electronic payment systems (EPS), advanced traveler information systems (ATIS), and public transportation operations (PTO). The course will also discuss the requirements, anticipated benefits, and the physical architectures of these systems. It will use case studies and "lessons learned" through system deployment to illustrate their use and implementation. This workshop is for members of the transportation community with responsibilities in transit planning, management, operations, and/or maintenance.

CANCELED

Snow and Ice Control Chemicals — Theory and Practice

September 24, Pullman; September 25, Ellensburg; October 1, Tacoma; October 2, Vancouver. **$35.** This class will cover the difference between anti-icing and deicing, when each is appropriate for use, and how to use each method correctly. Included will be information on the advantages and disadvantages of both liquid and solid deicers, how they work, why they work and their limits. Also to be covered is "Total Storm Management." This presents the steps required to proactively manage a storm event rather than react to it, and the benefits of a proactive winter operations program.

Plans, Specifications, and Estimate Preparation (PS&E)

September 26-27, Kent; October 24-25, Spokane; November 14-15, Lacey. **$40/$80**. Prices will increase next year. This two-day class covers the preparation of PS&E by WSDOT, consultants, and local agency staff. Instruction will be based on the Plans Preparation Manual as well as other references. The course includes contract special provision writing. It will cover the most recent requirements for preparing complete, biddable, constructable, and defensible plans, and the most recent requirements for writing complete, concise, and well-formatted special provisions.

LAG Training Program

Listed below are the courses being developed for local agencies to help them better utilize the LAG Manual. Some of the courses are being scheduled at this time. It is important that you indicate your interest in the courses by logging on to *www.wwsdot.wa.gov/TA/Operations/LAG/LAGprotrain.htm* and adding your name to the wait lists. For additional information, contact Darlene Sharar (360) 705-7383 of the Operations Office at Highways and Local Programs Service Center. Classes will be scheduled according to indicated interest.

- LAG Manual Overview: October 2, Tacoma; October 4, Spokane; October 15, Seattle.
- Section 106 Process-National Historic Preservation Act of 1966: LAG Manual Chapter 24.
- Environmental/Introduction: LAG Manual Chapter 24.
- Environmental/Advanced: LAG Manual Chapter 24: October 22, Olympia; October 24, Vancouver.
- Construction Documentation: LAG Manual Chapters 51, 52, and 53. Coming soon.
- Funding Workshop: LAG Manual Chapters 12, 21, 22, and 23. Agreements and supplements, prospectus, progress billings.
- DBE/EEO/OJT: LAG Manual Chapters 26 and 27. Coming in January/February.
- Consultants: LAG Manual Chapter 31.
- Qualified Testers: Focus is on required testing procedures for NHS routes with federal funding.
- Design Standards from PS&E to Award: LAG Manual Chapters 42, 43, 44, 45 and 46.
- Railroad Procedures: LAG Manual Chapter 32.
- Emergency Relief Programs: LAG Manual Chapter 33.
- Enhancement Program: LAG Manual Chapter 62.
- Right of Way Procedures: LAG Manual Chapter 25.

Cultural Resources Training

October 16-19, The Dalles, Oregon **$325**; October 19, The Dalles, Oregon. **Free half day**. This class provides an exceptional opportunity for Washington State local agencies to work with the northwest's most qualified instructors in cultural resources. Sessions take place at the Gorge Discovery Center . There will be presentations and discussions on Native American perspective on cultural resources, state archaeology, prehistory of Washington, Native American ethnobotany, prehistoric stone artifacts, rare plants, logging in the northwest, federal and state cultural resource regulations and how they apply to your agency. Highlights will be an evening dinner and discussion with a demonstration of flintknapping, and a field trip to view ancient petroglyphs. There will be in-field lessons on learning how to "read" the landscape and recognize the probable cultural resources located at the site. This course is offered twice yearly in the spring and fall. On October 19, for those who are unable to attend the whole 3 days, the last half day of training will be open and free to anyone who would like an overview of federal and state cultural resources regulations; and tribal, WSDOT and State Parks cultural resources management, procedures, perspectives and policies.

Subsurface Utility Engineering (SUE)

November 6, Everett; November 7, Tacoma. **$275/$375**. Subsurface Utility Engineering (SUE) is a relatively new interdisciplinary approach to managing the risks that existing underground utilities create on projects involving excavation. Many of these risks are a result of inaccurate, incomplete, or imprecise information on the location or existence of existing utilities. Subsurface utility engineering utilizes new and existing technology to collect and manage utility data, and transmits this data to the right parties at the right times in order to decrease project risks. The American Society of Civil Engineers has a pending standard titled "Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data." With the many different sources of information on existing utilities, the quality of the information can vary widely. ASCE's pending Standard addresses these differences by defining and then obtaining and depicting the "Quality Level" of utility information. This class will discuss the different quality levels and how to obtain and use higher quality utility information.

Intelligent Transportation Systems (ITS) Awareness Seminar (NHI)

November 6, Bellingham; November 7, Wenatchee. **Free**. A three hour course to provide an overall understanding of ITS and ITS infrastructure. The course illustrates the nine ITS infrastructure components by showcasing those systems that are deployed around the country. Institutional and technical elements in deploying ITS infrastructure are presented. The course includes planning, design, architecture, standards, procurement, installation and construction, operation and maintenance, and funding.

Applications of Geographic Information Systems for Transportation (NHI)

November 27-29, Seattle. **$345/445**. This course provides an overview of GIS for Transportation (GIS-T) and current state of practice at the Federal, state, and local levels. The course covers fundamentals, costs and benefits, implementation, street network files, data layering and cartographic, spatial database management, Linear Referencing System, and developmental framework for GIS.

Scheduled for 2002

- Stream Stability and Scour at Highway Bridges (NHI)
  January 29-31, Tacoma. **$345/445**.
- Bridge Condition Inspection Update
  February 6-7, Tacoma; February 20-21, Ellensburg. **Free**.
- Bridge Condition Inspection Fundamentals
  February 12-14, Tacoma. **Free to WA locals/$150 out of state**.
- Bridge Condition Inspection Training
  March 4-8 and March 11-15, a two-week course, Lacey.
  Free to WA locals/$150 out of state.
- Work Zone Traffic Control for Maintenance Operations on Rural Highways (NHI), April 22, Federal Way; April 24, Kennewick; April 25, Moses Lake. **$150/250**.
- Access Management, Location and Design (NHI)
  April 29-May 1, Seattle/Tacoma Area. **$345/445**.
- Pavement Condition Rating Workshops
  May 14-15, Moses Lake; June 11-12, Tacoma. **$45/90**.

What we're working on…..

- Media Relations Training for State and Local Governments (NHI)
- Introduction to Metropolitan Planning (NHI)
- Traffic Control Software and Signalization (NHI)
- Design Construction and Maintenance of Highway Safety Appurtenances and Features (NHI)

Associated General Contractors of Washington

Education Foundation

Contact: David Hymel or Adam Shinn
phone: (206) 543-5539 or (206) 284-4595
web: www.agcwa.com

To register for classes in this category, use the information listed above.

Certification in Construction Site Erosion and Sedimentation Control

Sept. 5-6, Seattle; Sept. 10-11, Olympia; Oct. 3-4, Vancouver; Oct. 17-18, Bellingham; Nov. 1-2, Seattle; Nov. 28-29, Wenatchee; Dec. 4-5, Tacoma; Dec. 11-12, Shoreline. **$250**. This course is the same one that has previsouly been taught by Environmental Affairs staff at WSDOT. Classes can be presented for individual agencies.

University of Washington

Engineering Professional Programs (EPP)

Contact: Emily West
phone: (206) 543-5539
fax: (206) 543-2352
web: www.engr.washington.edu/epp

To register for classes in this category, use the information listed above.

The following is a listing of TRANSPEED, PEPL and EPP classes. All three programs comprise the Engineering Professional Programs at the University of Washington's College of Engineering. For dates and costs that are not shown, check the above web site for updated information.

E.I.T./Fundamentals Refresher

September 5-October 15. **$425 early/495 late registration**.

Mechanical Engineering Refresher

September 6-October 16. **$525 early/595 late registration**.

Civil Engineering Refresher

September 13-October 18. **$445 early/515 late registration**.

Bridge Foundation Design

September 18-20, Seattle. **$265 public/465 non-public**.

Geology and Geomorphology of Stream Channels

September 26-27, Seattle. **$425 early/465 late registration**.

Managing Scope, Schedule and Budget

October 1-3, Wenatchee; November 28-30, Vancouver; January 16-18, Spokane. **$645 public/845 non-public**.

Stormwater Treatment by Media Filtration

October 9-10, Seattle. **$515 early/540 late registration**.

Traffic Engineering Fundamentals

October 10-12, Seattle. **$295 public/495 non-public**. Price includes $30 materials fee.

Effective Shop Management

October 13, Seattle. **$349 early/449 late registration**.

Hydrology and Basic Hydraulics

October 16-17, Seattle. **$220 public/400 non-public**.

Legal Liability for Transportation Professionals

October 18-19, Spokane. **$220 public/400 non-public**.

Effective Writing for Technical Professionals

October 22, 24, 29, 31, November 5, Seattle. 3:30-6:30 pm. **$390 early/420 late registration**.

Concrete Bridge Design

October 23-25, Olympia; December 4-6, Olympia. **$265 public/465 non-public**.

Traffic Calming Techniques and Management

October 29-31, Seattle. **$295 public/495 non-public**. Price includes $30 field trip fee

Cold Regions Engineering Short Course

November 1-5. **$1,095 early/1,155 late registration**.

Construction Inspection of Public Works Projects

November 5-6, Seattle; January 28-29, Spokane. **$220 public/400 non-public**.

Public Works Construction Project Management

November 8-9, Seattle; January 31-February 1, Spokane. **$220 public/400 non-public**.

Effective Project Negotiation Skills

November 6, Vancouver. **$295 early/325 late registration**.

Achieving Real Success as a Project Manager

November 7-8, Vancouver. **$455 early/485 late registration**.

Managing Project Delivery

November 7-9, Seattle. **$750 public/950 non-public**.

Roundabout Design Concepts and Guidelines

November 14-16, Olympia. **$265 public/465 non-public.**

Roadway Culvert Hydraulic Design

November 29-30, Seattle. **$220 public/400 non-public.**

Pavement Design

December 5-7, Olympia. **$265 public/465 non-public**.

Conferences & Meetings

Pacific Northwest Transportation Technology Expo

September 12-13, 2001, Grant Co. Fairgrounds, Moses Lake, WA. An exhibition of the latest technology in transportation engineering, construction and maintenance. This event is designed to showcase current leading edge technology emerging from research, new technology entering the market, and innovative home grown tools and techniques developed by public agency personnel through live demonstrations.

Contact: WSDOT T2 Center for information on this year's Expo
phone: (360) 705-7386
web: log on for a visual show of the 2000 Expo
http://www.wsdot.wa.gov/ta/T2Center/TechnoExpo/TechnoExpoHP.html

11th Northwest On-Site Wastewater Treatment Short Course and Equipment Exhibition

September 17-18, 2001.

Contact: University of Washington's Engineering Professional Programs
phone: (206) 543-5539

The 25th Annual Public Transportation Conference

October 8-10, 2001, Wenatchee Convention Center, Wenatchee. For more information log on to their web site at www.wsdot.wa.gov/pubtran/conference.

Road and Street Maintenance Supervisors' School

October 2-4, 2001, Spokane; December 4-6, 2001, Tacoma, Washington.

Contact: Kelly Newell
Washington State University (WSU)
phone: 1-800-942-4978.

Footprints and Bike Tracks

October 10-12, 2001, Westcoast Hotel, Olympia.

Contact: Mike Dornfeld WSDOT H&LP
phone: (360) 705-7258

American Public Works Association Fall Conference

October 16-19, 2001, Walla Walla, Washington.

Contact: Dick McKinley
phone: (509) 527-4463

41st Annual Idaho Asphalt Conference

October 25, 2001.

Contact: University of Idaho Conferences & Events
phone: (208) 885-6662

Road Builders' Clinic

March 5-7, 2002, Coeur d'Alene, Idaho. For information contact Kelly Newell at Washington State University 1-800-942-4978.

PNS Snowfighters Conference

June 3-5, 2002, Boise, ID.

Contact: Dave Jones (208) 332-7893 (Idaho)
or Clay Wilcox (360) 874-3050 (WA)
web: www.wsdot.wa.gov/fossc/maint/pns

It's all Relative

Gordy Hyde , Supervisor - Traffic Investigations, Snohomish County Public Works, took this picture in north central Oregon last April. Gordy says, "I can't tell you the name of the 'town' but apparently they have a traffic problem during 'rush hour'!"

Sign of the Times

Do you have a humorous traffic sign to share? Send us a print or e-mail a digital image (preferably a 300 dpi, 1000 x 1500 dpi jpg or tiff) and we will add it to our collection for publishing. Please provide your name, title, agency or company, and a short description of where and when you saw the sign. We want to give you credit for your participation. You can e-mail the image to *SundeD@wsdot.wa.gov* or mail the photo to:

"Sign of the Times"
WST2 Center
PO Box 47390
Olympia, WA 98504-7390

Please don't send your original photo. Although we will do our best to return the photo, we can't guarantee it.

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WST2 Web Site
www.wsdot.wa.gov/TA/T2Center/T2hp.htm

Toll Free Training Number
1-800-973-4496

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